

## 4.

# Field Notes on the Snakes of Kartabo, British Guiana, and Caripito, Venezuela.

WILLIAM BEEBE.

Director, Department of Tropical Research,  
New York Zoological Society.

(Plates I-XIII; Text-figs. 1-4).

[This contribution<sup>1</sup> is a result of various expeditions of the Department of Tropical Research of the New York Zoological Society to British Guiana and to Venezuela, all made under the direction of William Beebe. The Guiana expeditions were made during the years 1909, 1916, 1917, 1919, 1920, 1922, 1924 and 1926, and the Venezuelan trips in 1908 and 1942. The latter was sponsored by grants from the Committee for Inter-American Artistic and Intellectual Relations and from four trustees of the Zoological Society, George C. Clark, Childs Frick, Laurance S. Rockefeller and Herbert L. Satterlee, and by invaluable assistance from the Standard Oil Companies of New Jersey and Venezuela.]

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## INTRODUCTION.

In the year 1909, and from 1916 to 1926, eight expeditions went out from this department to British Guiana, and in 1908 and again in 1942 field work was carried on in Venezuela.

Throughout the course of these expeditions many field notes, color plates and photographs were made of tropical vertebrates, and the object of this present series of papers is to assemble and publish these notes and illustrative material. Any change or alteration of the original notes is placed between brackets. The chief value of these data is that they are concerned with living or recently killed specimens.

The observations in Guiana were made in one-quarter of a square mile of jungle at Kartabo, and those in Venezuela at or close to Caripito, which is only 528 kilometers northwest of Kartabo.

In addition to numerous technical papers in *Zoologica* and several popular volumes, there have been published the following general ecological summaries: *Zoologica*: (Kartabo) Vol. II, No. 7, 1919, pp. 205-227; Vol. VI, No. 1, 1925, pp. 1-193; (Caripito) Vol. XXVIII, No. 9, 1943, pp. 53-59. Also see "Tropical Wild Life in British Guiana" by Beebe, Hartley and Howes, published by the New York Zoological Society, 1917, pp. 1-504.

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My hearty thanks go to Dr. Charles M. Bogert of the American Museum of Natural History for many identifications and for bringing up to date my out-worn names of many years ago.

My original field numbers and other data have been appended to descriptions, breeding and other notes. These specimens are either in the collection of the Department of Tropical Research or in those of the American Museum. In the latter case the original field numbers are still attached with the additional catalogue numbers of the museum.

In the strictly limited localities at Kartabo and Caripito, we collected eight families of snakes, comprising thirty-six genera and fifty-four species. Six of these species were missing from Kartabo, in each case the snake being exceedingly rare at Caripito, represented by only a single individual. There were absent from Caripito twenty-two species or 40 per cent. of the total number. This lack was in line with many other groups of organisms, a comparative paucity of fauna due apparently to the extremes of dry and rainy seasons, these factors resulting on a considerable percentage of terrestrial or low-climbing forms finding life difficult or impossible at the heights of drought or of inundation.

Early in March, 1919, at Kartabo, we collected many specimens of an eel-like fish, *Synbranchus marmoratus*, the Marbled Eel-fish. These lived in leaf-choked creeks or in swamps and varied in length from 60 to 900 mm. They fed on small crabs and fish and possessed considerable powers of terrestrial locomotion, making their way across many yards of dry land from one body of water or swamp to another. In the laboratory they frequently made their escape from a pail and flipped about all night, taking no harm, although coated for many hours with a thick layer of dust and dirt. This introductory paragraph is to detail an important factor in the following complex.

The casual hoeing of an Akawai Indian was the direct cause of our discovery of a remarkable concentration of snakes. Within a period of eleven days, from March 20th to April 1st, 1919, from a marshy field given over for several years to the cultivation of rice, we obtained seventeen Tricolored Coral Snakes, *Micrurus lemniscatus*, varying in length from ten to thirty inches. Every one of these, with one exception, had swallowed a Marbled Eel or *Synbranchus*, almost exactly ten inches long. The seventeenth snake had two eels in its stomach, whose lengths, 7.5 and 2.5 inches, absurdly enough totalled ten inches.

The men with the hoes were provided with containers and with promised rewards, and the resultant serpentine fauna of this

marshy field comprised six species. Five of these were colubrine and the sixth was the above-mentioned species of coral snake. All these were united by several more or less unrelated factors: first an apparent preference for a wet, swampy terrain, combined with fossorial or nocturnal habits. In the case of four species they were associated by a pronounced diet of *Synbranchus*. Finally, and rather abstractly, we observed the presence in each of considerable scarlet in scale coloring.

The following is a résumé of this unusual aggregation of snakes, all taken in the single rice field.

*Micrurus lemniscatus*: Seventeen taken from rice field in late March, each individual feeding on a single 10-inch *Synbranchus*. *Color*: banded with black, white and scarlet.

*Erythrolamprus aesculapii*: Three of these coral snake mimics were collected, one feeding on a small real *Micrurus*, and two on *Synbranchus*. *Color*: black, white and scarlet banded.

*Hydrops triangularis*: Eight of these snakes from the rice field were all crammed with *Synbranchus*, one of these latter being only 70 mm. in length. *Color*: red above, white below, with many dark cross-bands.

*Liophis breviceps*: One from the same field with several earthworms and a 150 mm. *Synbranchus* in its stomach. *Color*: dark above, scarlet below with black cross bands.

*Oxyrhopus petola*: Two caught in rice field. Stomachs empty. *Color*: black, with numerous scarlet and yellow bands.

*Pseudoboa coronata*: One from rice field with a half-digested *Synbranchus* in its stomach. *Color*: scarlet, with black and white banded head.

Without the accident of hoeing in this particular spot, these six species and more than thirty-five individual snakes would never have been discovered.

#### FAMILY LEPTOTYPHLOPHIDAE.

Two species out of the forty-odd accredited to the single genus in this family were found at Kartabo and one of these at Caripito. These small snakes are doubtless much more common than captures indicate, the apparent rarity being due both to a nocturnal and fossorial life, and to their being frequently mistaken for earthworms.

Superficially they are not unlike the members of the succeeding family, but differ in character of dentition, osteology and scalation. There are only fourteen rows of body scales.

*Leptotyphlops albifrons* (Wagler, 1824).

*Names*: Worm Snake, Yellow-faced Worm Snake, Ant-nest Worm. Sabbai-ballu, "one



who lives in cushie ant nest" (Akawai Indian).

*Range:* From Mexico throughout almost all South America and in many of the West Indies.

*General Account:* These worm-like snakes just miss being lizards, for beneath their scales are the remains of very distinct hind limbs, bits of all three pelvic bones as well as traces of femurs. They are essentially burrowing and nocturnal, and spend most of their time in or near the nests of ants and termites. By their hard, impenetrable scalation they are protected from the attacks of these insects, and feed almost wholly upon them, their eggs and pupae. Especially during the rainy season they creep about the jungle floor, sometimes covering considerable distances and even climbing to moderate heights. Their teeth are few and delicate and confined to part of the lower jaw. They show unexpected power in pushing through jungle débris and termite nests, aided by a hard, pointed, caudal spine, and are exceedingly difficult to hold in the hand. They are probably the smallest of all snakes and the largest I ever measured was less than eight inches over all.

Both at Kartabo and Caripito we found them fairly common and were it not for their fossorial and nocturnal habits many more would doubtless have been seen.

I find scattered notes on fourteen specimens of this species:

Spec. No. 1: Kartabo, June 10, 1919, length 142 mm., diameter 3.2 mm. This snake was found in the course of digging a pit in the jungle in rolling, sandy soil. The tiny animal was two feet beneath the surface, and ten or fifteen yards from the nearest ant or termite nest. It was very active and its tongue played continually. It escaped from our hands three times, before we could secure it, forcing its head between our fingers. The general color was dark brown, hardly any lighter below, with the edges of the scales barium yellow, the spot on the snout reed yellow and the tail tip amber yellow.

Spec. No. 2 (Cat. No. 249): Kartabo, June 23, 1919, length 180 mm. Caught in daylight, coiled around a live bamboo twig close to the ground and the laboratory door. In the same clump a swarm of *Attas* were crowding into a hole, probably the reason for the presence of the snake, especially as two crushed *Atta* workers were found in its stomach.

Spec. No. 3: Kartabo, June 23, 1919, length 135 mm. Taken in a nest of *Attas* or leaf-cutting ants by our Indian hunter.

Spec. No. 4: Kartabo, July 4, 1920, Color Plate 153, length 143 mm., weight 1.1 gram. Body unusually dark brown, almost black,

head and tail creamy white. A half-digested mass of ant legs and heads was ready for ejection.

Spec. No. 5: Kartabo, August 31, 1920. Snout and tail dull olive yellow. Caught on a dead twig in a trail with swarms of termites in all directions after a nocturnal attack by a tamandua anteater on their low-swung nest. Watched the snake for half an hour, during which time it climbed eighteen inches up the rough bark of a half dead tree, winding in and out of crevices toward the damaged termite nest. I caught it when it had only three feet more to go to reach the nest. The termites ran past and over it, with neither snake nor insects paying any attention.

Spec. No. 6: Kartabo, June 10, 1922, length 170 mm. A single oval egg with half-formed shell found in oviduct.

Spec. Nos. 7, 8 and 9: Kartabo, All taken on March 1, 1924, in daytime, within an area of six feet on the surface of a jungle trail, during a light rain. Two of the snakes had been feeding on the cocoons of ants, the contents having been squeezed out and the husks about to be extruded.

Spec. No. 10: Kartabo, April 29, 1924, total length 162 mm., tail 10 mm., diameter 3 mm., weight 1.4 gram. Caught in heavy rain, creeping across trail.

Spec. Nos. 11 and 12 (Cat. No. 2884): Kartabo, May 23, 1924, lengths 100 and 150 mm. Both were taken near the entrance of a large *Atta* nest. The tongue of one was brilliant scarlet.

Spec. Nos. 13 and 14 (Cat. No. 30132): Caripito, June 8, 1942, lengths 125 and 195 mm.

#### *Leptotyphlops septemstriata*

(Schneider, 1801).

(Plate I, Fig. 1).

*Name:* Seven-lined Worm Snake.

*Range:* The Guianas and Amazonia.

*General Account:* Habits in general like those of *albifrons*. In appearance this species lacks the pale head and tail, and the body color varies from pale lilac to rich golden orange with seven to nine dark lines down back and sides. In most specimens the lowermost line is broken or reduced to a fine thread of pigment. The average size is larger than in *albifrons*, the largest reaching a length of nine inches.

This small snake can traverse considerable ground. One individual on a cloudy day covered eighteen feet over damp, forest débris in forty-eight minutes and then vanished forever. The seven-lined is less common than the other species. We did not find it at Caripito, and I have records of only twelve at Kartabo, with notes on two of these.





TEXT-FIG. 1. *Leptotyphlops septemstriata*. Lateral, dorsal and ventral views of head, and entire snake.

No. 343: Color Plate 243, October 6, 1920, length 170 mm., tail 6, body width 5, height 4 mm., weight 1.7 gram. Found in a small termite nest, under the spathe of a palm at the edge of the jungle. In its stomach were the remains of five mangled termite workers. The general color, above and below, was pale lavender with a silvery sheen. It showed seven lines with traces of two more. These were olive brown, beginning back of the head. The eye showed a round pupil of unusually large diameter, the narrow iris being pale pink.

On smooth ground the snake progressed slowly with vigorous undulations of the body, getting as much leverage from the lateral curves as from the pointed tail. It was absolutely smooth and slippery, difficult to hold. No effort at biting was observed even under provocation.

No. 504: Color Plate 325, February 24, 1922, length 215 mm., tail 6.5, body width 5.3, height 4.5 mm., weight 3.7 grams.

Found in a ground termite nest, one hundred yards back in the jungle. When held in the hand the edges of the scales could be distinctly felt and seemed to be an effective aid in pushing. The body was golden orange, deepening to tawny red toward head and tail. Seven longitudinal lines of dark brown, turning to black toward head and tail, and two other, very faint lines, making nine in all, extended down back and tail. The ventral scales were dark golden yellow. In some lights the entire snake shone like burnished gold. The small eye was distinctly pinkish.

#### FAMILY TYPHLOPHIDAE.

Only a single genus and species out of the five genera and more than twenty neotropical forms contained in this family were observed by us in the survey of the localities included in this paper. These burrowing snakes are larger than those of the preceding family and have twenty or more rows of body scales.



***Typhlops reticulatus*** (Linnaeus, 1758).

(Plate I, Figs. 2 and 3).

**Names:** Burrowing Snake, Two-colored Ant Snake, Spine-tailed Blind Snake.

**Range:** North and central South America.

**General Account:** These burrowing snakes frequently found in ant and termite nests are in general larger than the worm snakes, but show the same blunt head, spiny tail and firm, close-fitting, hard sculation. The eye is small and counter-sunk, and the mouth is edentulous except for a few teeth in the upper jaw.

Fifteen were recorded at Kartabo and three at Caripito, although others were reported at both places. The pattern and colors were varied. Six or seven were jet black above, several more dark brown, and one pale brown above. As to the ventral surface the black specimens usually showed contrasting white, while the dark brown snakes were pink below. The head and tail showed decided asymmetrical variation in pattern.

Cat. No. 232: Kartabo, July 30, 1920, length 255 mm., tail 10.5, body width 11.2, height 10, head length 4, eye diameter 1 mm., weight 16 grams. Most of dorsal area shining jet black, but head pale, immaculate back to end of rostral. Third dorsal scale white. Tail black, but with a seven-scale-wide white break, beginning with the eighth scale from the caudal end, broken only by the twelfth and thirteenth dorsal scales which are black. White below. In stomach two *Atta* workers.

Cat. No. 241: Kartabo, September 3, 1917, length 170 mm. Found in small termite nest near ground with no apparent exit of sufficient size. This individual was the palest worm snake of this species found at Kartabo. Pale tawny brown above and creamy white below. It was extremely sensitive to a sudden light flashed on it after dark.

Cat. No. 260: Kartabo, August 7, 1919, length 230 mm., snout 3.5, eye diameter 1 mm., weight 19 grams. Burnished dark brown above, pale salmon below. In preservative the latter has turned to rich chestnut. The rostral and nasal scales were dark salmon, with an irregular black blotch on the latter.

Cat. No. 263: Kartabo, Photograph 909, September 8, 1919, length 330 mm., weight 26 grams. Caught in early evening creeping over jungle leaves. On a smooth board this snake progressed very slowly, less by the rapid, lateral undulations of the whole body than by the constant sticking in and pushing with the short, stout caudal spine. Repetition of this movement was constant, and seemed certainly to be the chief function

of this organ. The food was a mass of about twenty termites, well crushed, and mixed with bits of nest débris.

Cat. No. 581: Kartabo, May 8, 1922, length 365 mm., tail 14 mm., weight 40 grams. Caught when crawling out of the ground, ten feet from an *Atta* nest. I followed it as it crept for fifteen or twenty feet to a sandy bit of the jungle, when it burrowed so fast that it was necessary to dig it from a depth of about eighteen inches. It was brownish-black above, pinkish below. The latter color changed in preservative to cinnamon buff. The rostral was wholly pink and the nasals partly and asymmetrically of the same color. From the eye to the back of the head the dorsal black extends well down on the sides. At the tail a broad band of the ventral color stretches clear across the dorsal black.

Cat. No. 30113: Caripito, May 20, 1942, length 200 mm. Brownish-black above, lemon yellow below.

Cat. No. 30113a: Caripito, May 20, 1942, length 230 mm., weight 10 grams. Caught in Pit No. 12, in open llanos, thirty feet from low jungle. Brownish-black above, lemon yellow below. Head black with four, short, broad bands of buff down rostral and nasals, to tip of snout which is all buff. Below lemon yellow on fore body, paling back of this area. The dorsal black extends around on to the ventral side at the level of the posterior part of the head, but does not meet on the mid-ventral line. The same pattern holds for the tail, the black almost meeting on the ventral line a short distance from the tail tip. The scales are so hard and close fitting that it seems as if no ant or termite could penetrate them. I tested this later with another specimen by dropping it into a mass of angry *Atta* ants. It suffered no harm from the workers although they did their best, and in spite of being badly bitten myself I could not persuade the giant-headed soldiers of the home guard to attack the reptile.

A half grown worm snake dropped in a tangle of army ants had short shrift, and a dozen of the insects fixed their jaws into the unfortunate snake before I could retrieve it and drop it into alcohol.

Every structure of this snake is adapted for burrowing; the mouth is shark-like, far overhead by the snout, the eye is small and under the scales, the mouth is small with slight ability of mastication, either merely crushing or swallowing its ant food whole. In a specimen taken soon after the present one were the remains of 36 termites and even a recognizable guest staphylinid. These snakes show great resistance to death by drowning, surviving in water for an hour or more with no access to air.



## FAMILY INILIIDAE.

This is another primitive family of degenerate eyed, burrowing snakes. The eyes are very small and sunken beneath the scales, while the dorsal and ventral scales are all small and sub-equal. The coloration is brilliant, pink and yellow, with numerous, broad, irregular cross-bands of black. A single genus and species is known from South America.

*Inilius scytale* (Linnaeus, 1758).

(Plate I, Figs. 4 and 5).

*Names:* False Coral Snake, Scarlet Ground Snake, Chain Snake. Sarree-booh, "love on the leaves" (Akawai Indian).

*Range:* Northern South America, east of the Andes.

*General Account:* This is a strange snake. It is the only neotropical representative of its family, it has pelvic vestiges connecting it with the worm snakes and boas, and it is brilliantly colored although in structure as well as in habits it is decidedly fossorial. It was not rare and we caught a considerable number at Kartabo, but did not find it at Caripito. I noted no habits of especial interest.

Eight specimens of these brightly colored burrowing snakes were found from April to July 1916, and three others in June and July, 1920, in a deserted rice field, where we also captured twenty true coral snakes (*Micrurus lemniscatus*).

Coll. No. 227: May 30, 1919, length 560 mm. Found among the decayed mould of a fallen tree. This individual possessed fifty-one black bands, of which sixteen are semi-bars. All of these latter are uniformly alternate, ending abruptly at the mid-line. The ground color is coral red, with the head brownish. The small eyes are in the center of a single scale, close to the anterior edge of the first black bar. In the stomach were three small *Typhlonectes* and four crushed Orthoptera.

Coll. No. 240a: Color Plate 268, November 8, 1920, length 660 mm., tail 27, body width 12, height 10, head length 13, width 11.5 mm., rows of scales 21, ventrals 225, subcaudals 13. This snake has forty-four black cross bars on its coral red background, of which eleven are Y-shaped, being double on one side. The lower sides and ventral surface are pale straw yellow. In life the eye has a large, round pupil, with a narrow pink iris, the whole flat and under scale. In preservative, after twenty-four years the black has changed to pale cinnamon brown, and the red to creamy white.

Coll. No. 3516 (body) and 3517 (skin): Female breeding, Color Plate 771, June 21, 1924, length 530 mm., tail 20, body width 13, height 12, head length 14, width 9.5,

eye diameter 1 mm., scale rows 21, subcaudals 14, weight 38.5 grams. The colors are bright scarlet, jet black, and clear, strong lemon yellow below. After the color plate was made, the snake was skinned and mounted on a sheet of pasteboard. Today, in 1946, twenty-two years afterwards, the colors of the skin are exactly as in life. There are forty black bands, whole or broken, of which twenty-three are complete, a few are Y-shaped, and others are alternate, crossing each other in mid-back.

## FAMILY BOIDAE.

Among boas we find the largest and most powerful of serpents. Like the preceding families they are primitive, and possess the remains of a pelvis, while some even have an external claw altered from its original use as an aid in locomotion in lizard-like ancestors to a sexual function. Cretaceous fossil boa-like creatures which lived fifty million years ago are so much like living species that we may assume that little evolution has taken place throughout this long period.

In South America there are seven genera and about fifteen species. Of these, four genera and five species were recorded in the course of our studies in British Guiana and northeastern Venezuela.

*Boa canina* Linnaeus, 1758.

(Plate II, Figs. 6 and 7).

*Names:* Green Tree Boa, Dog Boa, Yellow-faced Boa, Parrot Snake. Yea-tah-yahmo (Akawai Indian).

*Range:* Northern and central South America.

*General Account:* No tree boas were seen at Caripito, and only five taken at Kartabo. Others were probably often in full view but unobserved owing to their quiescent habits in the daytime and their protective coloring. In general the color is bright green above, spotted and narrowly banded with white, with much of the head and the under parts yellow. This ruptive patterning, combined with the spots of sunlight on the jungle foliage, renders the snake all but invisible.

We found it usually bunched or draped in a more or less compact ball or closely wound series of coils. It was not vicious, and after a preliminary fight for freedom, seemed to accept captivity with a sort of watchful waiting.

Coll. No. 228: Color Plate 36, Pelvis KOH 19123, May 25, 1919. Length 1540 mm. (5 feet), weight 910 grams (2 pounds). General color above peacock green with the usual irregular white cross bands, and olive yellow below, this latter color extending over much of the face and all labials. Iris light orange brown. This pigmentation



made the snake darker than any other specimen.

Found on a branch six feet up, and it made no effort to escape until seized, when it struck viciously and constricted with all its force. It soon relaxed and clung closely but not too tightly to my hand and arm as I carried it to the laboratory.

Coll. No. 559: Color Plates 373 and 374. Photographs 1740, 1754, 1755, 1756, 1757 and 1762. April 23, 1922. Length 1330 mm. (4 feet, 4 inches), tail 200 mm., head length 52, width 40, body width 24, height 34, eye diameter 7 mm., weight 437 grams.

*Colors:* General color of head above parrot green, lighter on snout and around eye; the deeply pitted upper labials light viridine yellow with pinkish shading on their most recessive parts. Lower labials pale greenish-yellow shaded with light viridine yellow. Body above parrot green anteriorly shading through calliste green to yellow green on the tail. Starting on neck are scattered transverse markings, sometimes joined, sometimes alternating, one to five or six scales wide on median line, tapering on upper sides. These markings are white, more or less clouded with gray. They are vaguely bordered with a wide clouding of dark ivy green, these borders being very wide anteriorly, sometimes running into each other, while posteriorly they are sparse. Sides of body yellow green, lighter toward tail. There are a few small touches of empire yellow here and there along the sides, and one large one about mid-body. Extreme lower sides of body empire yellow anteriorly the remainder being faintly mottled with the same color, while glaucous blue scales appear here and there along the area of greatest girth and toward the tail. Here there are also a few splotches of pinkish-white at long intervals. Chin and ventrals naphthaline yellow, while a faint lateral stripe of empire yellow extends down the tail.

Pupil vertical, the line of the pupil extended up and down by a deep groove heavily stippled with dark gray. Iris straw yellow with faint gray stippling all over, which becomes more dense and arranged in the form of two crescents on the sides of the pupil, leaving narrow lines of clear straw yellow next to the pupil. Veins in iris and its periphery faintly tinged with orange. Mouth inside lavender tinged with bluish-white. Predominating colors of universal sheen over whole body are bengal green, chrysophrase and golden orange.

***Boa endris cookii* (Gray, 1842).**

*Names:* Yellow-marbled Tree Boa, Brown Tree Boa. Ya-mung (Akawai Indian); Macaurel, Oroya (Spanish).

*Range:* Northern South America, Panama, Lesser Antilles and Trinidad.

*General Account:* Six of these tree boas were recorded from Kartabo and two from Caripito. The variation in both ground color and pattern is very considerable, and is most confusing for ocular field identification. But a tree snake with vertical pupils, plain gray or brown, or with intricate dull yellow mottlings will probably be this species.

This boa is essentially arboreal and nocturnal, although they seem at times to descend to the ground as is proved by two specimens of the terrestrial frog *Elachistocleis ovalis bicolor* which I took from the stomach of one boa. Trust in immobility and their resemblance to branches and twigs seems reflected in the ease with which they can be approached in daylight and seized. Poor eyesight may also have something to do with this.

Coll. No. 349: Kartabo, June 3, 1920, length 650 mm. *Color in Life:* Unmarked buffy-brown, and only slighter lighter below. It was coiled in a tree, and when seized by the neck managed to get two of its long anterior teeth into my finger, at the same time vibrating its tail against the twigs so that I was startled by the rattling. The Indians are in deadly fear of this boa, and with more superficial reason than in the case of colubrine tree snakes. The number and length of the anterior fang-like teeth, the swollen posterior portion of the head, the vertical pupils, and the unusually loud hiss of the buffy tree boa, all have sinister appearances. But the teeth and mouth are always clean and the bite innocuous.

Coll. No. 2677: Kartabo, Color Plates 683 and 684, April 5, 1924. Total length 1200 mm. (4 feet), body 940 mm., tail 260, body width 16, height 26.5, head length 29.5, width 19, eye diameter 4 mm., rows of scales 58, ventrals 276, subcaudals 120, weight 172.2 grams. *Color in Life:* General color of body light grayish-olive, with many alternating patches, some complete, some broken, on each side of dorsal aspect, olive brown. These darken dorsally and fade downward into very much broken perpendicular lateral streaks and markings of buffy olive which reach to the edge of the ventrals. The dorsal markings are darker toward the head and the tail. Also toward the head and tail they take on the appearance of the Greek letter omega, at mid-body looking like thick, downward-pointing crescents. All these markings have a faint center of cream color, and are rimmed above with the same. The space between is filled with a mottling of grayish-olive, with a few dark splotches, forming a more or less continuous wavy line down the dorsal



ridge. Head, labials and anterior chin cream color, with an area in front of eye light grape green. Head above covered with finely interwoven pattern of dark brown lines, which leave still finer lines of the cream between. One heavy lateral dark streak backward from the eye, a narrower one from eye forward and up over snout; two from upper part of eye backward, small spot and a few crescentic markings on nuchal region. Neck and posterior chin and anterior ventrals tinged with tea green; remaining ventrals pale olive buff, each tinged with creamy buff along posterior edge, and with very fine stippling of grayish-olive, which becomes pronounced toward tail, where there is a mass of confused mottling. A few dark spots on snout and lower labials. Posterior upper labials with deep notches. Iris dull cream color with fine gray stippling, pupil rim more brilliant, and an area of dark sepia stippled around the vertical pupil.

Coll. No. 30059: Caripito, April 20, 1942, Total length 1880 mm. (6 feet, 2 inches), tail 370 mm. *Color in Life*: Above uniform olive green, changing posteriorly into pale brown, with more and more black encroaching on the scales from well before the anus to tail tip. Below creamy white, each scale washed with a sheen of lavender. Along both sides of the ventrals from a distance before anus equal to the length of the tail, there is an irregular series of black spots, becoming larger and extending clear across ventrals under the tail. The tail ends in a sharp spine. In preservative the colors change to olive buff above, and warm antimony yellow below. This boa was caught coiled among the small branches of a low tree at the edge of the savanna. It allowed itself to be grasped around the neck, when it coiled and uncoiled like lightning, hissing loudly.

Coll. No. 30150: Caripito, June 22, 1942, length 700 mm. *Color in Life*: Light red-brown, appearing uniform at first glance, but after being grasped, a series of faint, but dark markings became apparent, quite distinct on the tail, in general pattern recalling those on No. 2677, but in only two indistinct shades of brown. There was a slight but definite color change, the dark markings remaining after death. Below pale yellow brown. The eye with its vertical pupil appeared large and conspicuous in life, and was of such a rich orange brown that until killed and identified we labelled this specimen the Orange-eyed Tree Boa.

***Constrictor constrictor constrictor***  
(Linnaeus, 1758).

(Plate III, Figs. 8, 9 and 10).

*Names*: Boa Constrictor. Land Camoodie (Creole).

*Range*: Northern and central South America, east of the Andes.

*General Account*: The boa constrictor is a fairly common snake both at Kartabo and Caripito. At the latter place we found only small and medium specimens but at Kartabo, among the twenty or thirty collected, eight were from eleven feet to twelve feet six inches in total length, measured when still alive, before shipping north to the New York Zoological Park.

The pattern and color of this snake are too well known to make it worth while to reproduce my detailed notes. At Kartabo there were two more or less distinct and definite color phases, independent of age or sex. One was characterized by rich, warm hues of chestnut and browns, and the other was darker and colder in general color, with drab and olive greens replacing the warmer tones. Invariably the body colors increase in brilliancy and contrast throughout the length of the tail, but in spite of this apparent conspicuousness these serpents were exceedingly difficult to discover in daylight when they were draped over a fallen tree, or coiled in the crotch of a branch.

The eyes, which would be revealing characters, are always obliterated by two to four black or brown marks radiating forward, down and back. The one from the nostril back to the eye bisects the iris, thus destroying all appearance of regularity of outline. (Plate III, Fig. 8).

In greater detail, the iris is rather abruptly, pigmentally divided transversely just above its equator. When the eye is at rest this line coincides exactly with the sharp division of color which separates the pale brown of the upper head from the black line extending along the upper side of the head and face. The eyeball has sufficient mobility at times slightly to disrupt the exact continuity of this pattern of iris and scales. The upper part of the iris is pale smoky gray, sparsely and irregularly flecked with dark; the lower portion is fuscous, obscurely mottled, and paling at the very bottom (quite invisible most of the time) and near the pupil. This latter results in a bright thread-width line around the pupil. The pupil is narrow and vertical, extending almost across the entire iris, and coming to a sharp point above and below.

Most of our specimens were taken at night, as they crawled along the trails or crept over low branches. A small boa was captured in the thatched roof of an Indian benab just as it was seized by a six foot black jungle racer (*Cloelia c. cloelia*). This was the only enemy of the boa constrictor I recorded. Three stomachs contained the following: Cat. No. 692, one large *Ameiva* and a small *Cnemidophorus*; No. 2757, an



*Ameiva* tail, a large antbird, a spiny rat; No. 2876, one large *Ameiva*, a spiny rat, which in turn contained four embryos.

Eighty per cent. of our boa constrictors were captured at the height of the long rainy season, May through July. Like other boas these snakes put up a strong fight when first caught, then give up and in most cases can be handled at will thereafter without showing any resentment or attempt at attack.

On June 28, 1922, our Indian hunter Degas reported a large land camoodie coiled near his village. We found a boa of large size wound over a fallen log with a burrow of sorts just beneath. It had been there at least five days and the brilliancy of its skin seemed to indicate a recent shedding. We rushed it and took it home and with some difficulty found that it measured at least twelve feet, six inches over all.

The next day when I was preparing to remove the boa from its cage for the purpose of photography I was surprised by a loud hiss which lasted so long that I sent for a stop watch. I pounded on the cage wire, the snake struck short, and laying its head flat on the ground it hissed steadily for 25 seconds. In response to intermittent pounding on the wire it hissed 17 times with an average of 20 to 30 seconds each time. The intervals lasted from five to ten seconds and during these short periods the air rushed into the lung and the body visibly swelled. The sound was exactly like steam escaping from a radiator. The hiss did not seem particularly loud, yet was distinctly audible 100 feet away.

A few days later I held its head for a water color portrait and found that I needed all my strength to uncoil its tail when that organ once got a twist around my body. When first caught it gave forth a most nauseous odor but this was not noticed again. In handling it many times I never saw it make a swift motion.

Four boas were measured immediately after death,—as follows:

Cat. No. ....	692	692a	2757	2876
Total length .....	880 mm.	910 mm.	1345 mm.	1650 mm.
Tail .....	96	105	155	190
Eye diameter .....	4.4	5	6	7
Body width .....	23	23	50	53
Body height .....	34	34	70	76
Rows of scales.....	91	96	93	95
Ventrals .....	237	239	243	239
Sub-caudals .....	58	63	57	60
Weight .....	277 grams	309 grams	4 lbs.	7.5 lbs.

*Epicrates cenchris cenchris* (Linnaeus, 1758).  
(Plate IV, Figs. 11, 12 and 13).

*Names:* Rainbow Boa, Ringed Boa, Peacock-eyed Boa. Aboma (Creole).

*Range:* Northern and central South America.

*General Account:* The rainbow boa is not rare; at Kartabo we took 12 individuals, and two at Caripito. The Kartabo snakes occurred from March to May. None of these specimens showed the uniform coloration ascribed to some captured in other parts of Venezuela. All of our snakes had the rings and ocelli well developed. Three, however, showed a general pale brown and orange pattern with little iridescence, while all the others were of rich dark colors, with pronounced yellows and were brilliantly iridescent. Most of these boas were coiled on branches in the daytime, or moving slowly on the ground in twilight or moonlight. Two were captured as they were trying to rob hen roosts near Indian benabs.

Coll. No. 315: Kartabo, March 5, 1921, Color Plate 314, total length 914 mm., rows of scales 52, ventrals 250, subcaudals 63. This was one of the pale types with very little iridescence, not typical of the majority of the specimens. The iris reflected this diminishing or lightening of pigment, and was pale silvery, densely shot with a maze of fine black veins. The pale clay color of the interior of the fifty-odd dorsal circles made these stand out much more strongly than in the darker individuals. The post ocular black band was very prominent.

This boa had devoured an antbird and a pullet, the latter from the coop of our Akawai Indian hunter, where the snake was captured.

Coll. No. 732: Kartabo, May 10, 1922, Color Plate 381, Photograph 1802, total length 1828 mm. This boa was the most beautiful specimen we saw, its steel-blue iridescent markings contrasting strongly with the rich orange background. *Color in Life:* In detail it was orange brown above, shading through ochraceous tawny and tawny to cinnamon brown on lower sides. Ring markings on back alternating with large oval splotches of dark blue-black on lower sides. These side markings have a small crescent of warm buff above their center, topped with a larger crescent of shining

blue. Head above, pecan brown with darker markings. Sides of face livid brown. Labials vinaceous fawn clouded with deep purplish-gray. Ventrals light buff tinged with pink. Ground color of tail pale reddish, the markings clouded with gray. Claw ivory



yellow. Rainbow-like iridescence over the whole snake, the sheen over the ground color mainly golden, green and orange, over the markings chiefly indigo, greenish-blue and violet. Iris very dark brown, a little lighter in a faint border around the vertical pupil, but everywhere veined with black.

One day when I lifted this six-foot boa by the neck it threw three coils around my wrist and lower arm and twisted the tail across the coils in a strong tight overlapping lock. The head and neck remained limp in my hand but the rest of the body began a slow, rhythmic pressing, tighter and tighter. This turned to a throbbing which I soon found was the beating of my own blood. My hand became reddish, then bluish, and the veins stood out strongly. After taking movies of this effect I was glad to unwind the boa as the pain was considerable. Traces of the compression were visible the following day.

Coll. No. 2635: Kartabo, March 3, 1924, Color Plate 652, total length 1600 mm. (5 feet, 3 inches). Rows of scales 48, ventrals 274, subcaudals 61, weight two and one-half pounds. The background of dark brown shows little iridescence, but the rings and ocelli are ablaze with shining ultramarine, and the dorsal crescents of the lateral ocelli are brilliant gold. The labials, chin and under surface are mouse gray.

Coll. No. 2867: Kartabo, May 20, 1924, total length 1360 mm., tail 194, body width 36, eye diameter 5.2 mm., rows of scales 51, ventrals 276, subcaudals 61, weight two and one-quarter pounds. This boa was caught in the chicken coop of our Indian hunter, but its stomach was still empty.

Coll. No. 30173: Caripito, July 31, 1942, total length 1200 mm. Captured at dusk stalking a large frog which seemed unaware of its enemy's approach. *Color in Life*: Background above down to lower sides chestnut brown, below pale orange yellow. Dorsal pattern a series of more or less regular, contiguous rings formed of narrow, blue black lines. Some of the markings fail to extend across the back, resulting in hour-glass rather than paired rings. On the sides in the concavity patterns formed by the junction of the dorsal rings is a series of ornamental ocelli, each a large, round, iridescent blue spot, bordered on the dorsal half by a wide crescent of yellowish-white, and above this a second, similar but narrower boundary of blue black. Alternating with and below these ocelli are two series of irregular and less distinct roundish or oval spots. The ventral scales are immaculate. In this four-foot boa there are 56 of the rings and ocelli from head to tail tip.

***Eunectes gigas* (Latreille, 1802).**

(Plate V, Figs. 14, 15 and 16).

*Names*: Anaconda. Water Camoodie (Creole). Ow-oo-rah, Sal-ur-ring-mah, "quick runner" (Akawai Indian).

*Range*: South America east of the Andes.

*General Account*: The anaconda is the giant among American serpents with an accredited length of 29 feet, but the largest taken by us was close to Kartabo, where one of these boas measuring 17 feet, two inches was shot from a branch overhanging the water a mile down river.

Eleven were taken and others seen at Kartabo, and two small ones at Caripito. This is essentially a water snake and from three stomachs we took 27 fish, including sharp-spined catfish and four species of armored catfish. Occasionally they were found in the jungle but never very far from the river, and more often coiled on a branch over the water or on the sandy shore.

The following individual will serve as typical of the species;

Coll. No. 540: Kartabo, May 27, 1922, Color Plates 371, 372, Photographs 1742, 1743, total length 917 mm. (three feet), tail 90, eye diameter 5 mm., weight 280.4 grams. Another young anaconda only two-thirds (665 mm.,) as long as the present one, weighed only one-quarter (69 grams) as much.

*Color in Life*: Top of head dark olive, almost black on orbits; side of face in front of eye, upper labials and post oculars dark olive. A broad cinnamon band equal in width to eye extends from eye to posterior point of jaw, becoming darker and narrower on side of neck. This cinnamon band is bounded below by a narrowed band of black which extends along the neck. Back olive green with many alternately placed, irregular, large, round and oval black spots. Sides buffy brown with smaller, more crowded spots of orange yellow, edged with black. The lowermost of these are much broken and extend in places over the ventrals. Chin pale pinkish-cinnamon flecked laterally on the throat with gray and black. Ventrals warm buff with exceedingly variegated markings composed of small, black, geometrical patches, which frequently form two broken, longitudinal lines. Pupil vertical, much shorter than in the boa constrictor. Also it is not double pointed but rounded above and below, and with a slight median constriction. Iris dark citrine with faint dark mottlings.

This, like a number of other specimens, was taken on the sandy beach in front of Kartabo on a moonlight night. It was so lethargic that it allowed me to pick it up, whereupon it put up the usual, brief boine fight. It is difficult to distinguish anacondas



when they lie motionless, for they rest so flatly on the sand that they scarcely cast a shadow, and when they move, it is so silently and in so straight a line that the ear and eye give little warning. More than once I have attempted to catch a snake and have seized only sand, the serpent having vanished without my sensory knowledge, leaving only the faint shadow of a shallow depression in the sand.

#### FAMILY COLUBRIDAE.

This family contains the great majority of living serpents, but satisfactory characters for sub-division are still to be found. In the present paper twenty-five genera are included, leaving only eleven belonging to all the other families, and 39 species as compared with only fifteen representing the remaining families of serpents. With the exception of the worm snakes, boas and such poisonous forms as the coral, fer-de-lance, bushmasters and rattlers, all others are classified as colubrine.

#### *Atractus trilineatus* Wagler, 1828.

(Plate VI, Figs. 17 and 18).

*Names:* Stub-tailed Snake, Three-lined Worm Snake.

*Range:* Guianas, Eastern Venezuela and Trinidad.

*General Account:* This is a small, round, stocky snake, with small pointed head and very short, stubby tail adapted for burrowing. The eye is small with round pupil. It is dark brown above, with three longitudinal black lines, and usually lemon yellow below. It is fairly common both at Kartabo and Caripito, but discoverable chiefly by digging. In the dim light of the jungle it may, at first sight, be mistaken for *Leptotyphlops*.

In a dozen specimens the total lengths varied from 112 to 256 mm. They were taken from March through August. *Atractus* is a rather slow moving snake, never biting, but pushing continually with both head and tail. The latter has a sharp pointed tip which is used with considerable force as in *Leptotyphlops*, driving the creature ahead through one's fingers. When placed on soil it at once burrows out of sight. A female of 250 mm., had three eggs in the oviduct, two complete with leathery shells ready for deposition. They were oblong, equal-ended and measured 20 by 8 mm.

Coll. No. 525: Kartabo, April 3, 1922, Color Plate, total length 235 mm., tail 14, head length 6, eye diameter .9 mm., ventrals 139, subcaudals 15, weight 5.6 grams. *Color in Life:* Head above cinnamon brown with distinct asymmetrical mottlings of mummy brown. Back hazel brown with three longitudinal stripes of dark clove brown. Upper labials citrine yellow. The upper side of

body below the lateral dorsal stripes, tawny olive and below this a faint, narrow line of brown. Lower labials, chin and anterior ventrals lemon yellow. Remaining ventrals mustard yellow with pinkish tinge. Iris dark cinnamon brown.

Coll. No. 246: Kartabo, August 31, 1920, length 256 mm., tail 14.7, head length 6.5, body width and height 6 mm., ventrals 150, subcaudals 13, weight 5.6 grams. In life this specimen was fuscous above, with the three lines brownish-black. The ventral surface pinkish-buff, which deepened to tawny olive on lower sides. Iris very indistinct, with black mottling.

A young specimen taken March 6, 1924, only 165 mm. in length, had a tail of 14 mm., ventrals 135, subcaudals 19 and a weight of 2.7 grams. This was taken from the stomach of an *Erythrolamprus aesculafii*.

All of the *Atractus* taken at Caripito were considerably lighter in color than the Kartabo ones, with the ventrals creamy white. Two out of five (Nos. 30070, 30122) were found in Pit 13, the only one dug outside of the jungle proper, a few yards from the nearest trees, at the edge of the open savanna.

#### *Chironius carinatus* (Linnaeus, 1758).

*Names:* Golden Tree Snake, Yellow-lipped Tree Snake, Yellow-belly (Creole). Sipo (Native).

*Range:* Northern South America to Brazil and Bolivia.

*General Account:* This is a rather slender snake, essentially arboreal, either sage green above and bright yellow below, or blackish-brown above and steel blue below. It is usually found draped among dense foliage or creeping slowly along. When frightened it can move faster than the eye can follow. It is nervous and vicious in disposition and can seldom be caught without getting in at least one bite. Its enormous gape gives it an especially alarming appearance although it is quite harmless. The eye is unusually prominent with a round pupil.

About 25 specimens were taken and others seen, from March through August at Kartabo. We did not find it at Caripito. In length our captives varied from 600 mm. (two feet) to 2850 mm. (nine feet, four inches), this being, I think, the record for the species.

*Colors in Life:* Coll. No. 2612: Young snake. Pale blue above with wide white vertebral stripe. Pale yellow below.

Coll. No. 2814: 900 mm. Dark olive green above, picric yellow below.

Coll. No. 2822: 1249 mm. Dark olive green above with a purplish tinge, pale yellow below.

Coll. No. 2802: 957 mm. Color Plate 133, head and body above grayish-olive, with a



light vertebral band. Below empire yellow on labials, fading down neck to pale lemon yellow, into the general ventral color of light greenish-yellow. Tail lemon yellow below. Eyes very prominent; iris inner half brackish-brown, changing rather abruptly with a concentrated stippled margin into pale silvery yellow on the outer half. Pupil surrounded by a very narrow yellow ring. Tongue long, slender, shooting out 20 mm., rich dragon's-blood red.

Coll. No. 2801: 741 mm. Very young snake. Top of head saccardo umber, back brownish-olive, russet on snout. Upper labials, throat and first few ventral strontian yellow, shading through green to honey yellow under tail. Sides of body sage green. Outer edge of iris colonial buff flecked with orange. Dark patch around pupil brown, flecked with gold.

Coll. No. 2668: 1020 mm. Like No. 2802, but with two bright lateral yellow stripes along tail.

Coll. No. 2764: On the dark brown of the back, at mid-body, this individual has a number of oblique markings, angled, pointing backward, narrow bands in pairs, the width of the pair equalling the interspaces. These are composed of broken lines of lemon yellow spots, much smaller than the scales on which they occur. The ventrals of the anterior half of the body are colored steel blue and lemon yellow in equal proportions. On the posterior half of the body the blue dominates, but on the tail the yellow again appears abruptly and eliminates the blue. The upper labials, chin and throat are immaculate golden yellow. After 22 years, the skin of this snake, mounted on cardboard, shows no change of color whatever.

Coll. No. 2855: 1420 mm. Color Plate 1176, sage green above, the pale vertebral stripe scarcely visible. Upper labials, chin and anterior ventrals chalcedony yellow with faint gray line down center, brightening to empire yellow under tail.

*Food:* One snake was caught with quite half of its body wedged between the wire meshes of a cage in the laboratory holding five *Hyla maxima*. Another was captured while climbing up to a nest of two nestling antbirds. A third had swallowed a large *Leptodactylus* frog.

Measurements of freshly killed specimens:

Coll. No. ....	2801	2940	2802	2668	2764	2855	2922	320
Total length (mm.)...	741	903	957	1020	1125	1420	2320	2850
Tail (mm.) .....	201	328	257	420	395	500	883	950
Jaw length (mm.)....	21.5		25	29	33	39	42.5	46
Eye diameter (mm.)...	4	5.5	6	6	6.5	8	8.5	10
Rows of scales.....	12	12	12	12	12	12	12	12
Ventrals .....	151	190		150	159	154	184	184
Subcaudals .....	140	180		146	139	129	190	194
Weight (grams).....	6.8	19	13	52	68.5	180	1 lb.	1 1/2 lbs.

**Chironius fuscus** (Linnaeus, 1758).

(Plate VI, Fig. 19).

*Names:* Red-fronted Tree Snake; Green Tree Snake. Cow-um-bung, "one who lives in high bush" (Akawai Indian).

*Range:* Northern and equatorial South America.

*General Account:* A long, well-built, constricting arboreal snake. Typical pattern brown above with numerous, well-spaced, pale, dark-edged, double cross bands, below yellowish-white mottled with brown, head with black posterior eye streak, reddish on snout, labials and anterior ventrals. Two vertebral lines of black along dorsal keels. Individually the cross bands may be wholly lacking in both young and adults, or the entire snake may be green, deeper above and pale below. We saw none of the green phase longer than 535 mm. Besides the possession of 10 rows of scales (instead of 12 as in *C. carinatus*), the iris in this species is characteristic. In the green phase the dark mottling covers almost the entire iris evenly, but in all brown forms the only part of the iris free from the solid brown is the periphery of the upper fifth of the visible eye, this being pale gold. (Plate 0, Fig. 0). All the various color phases were taken within the quarter square mile of jungle at Kar-tabo. We did not find this snake at Caripito.

Of the 24 specimens captured, more were taken on the ground than was the case with *C. carinatus*. Three of these were of the green phase. All were active and vicious, striking at every opportunity.

*Colors in Life:* Col. No. 3294: Rich red brown above, salmon below. Col. No. 3554: June 12, 1919. Liver brown above, covered with a purplish sheen, ferrugineous below.

Coll. No. 2669: Color Plate 151, 1242 mm. General color above cinnamon brown, with two dark brown vertebral stripes. Faint oblique cross bands of fuscous about an inch apart, each with a broken border before and behind of the dark color. Top of head chestnut brown, changing to russet anteriorly. Upper labials white, the anterior three, and the upper parts of all cinnamon rufous. Ventrals white heavily tinged with pale ochraceous salmon toward head, mottled thickly toward tail with vinaceous and dusky. Lower three-fourths of iris dark brown ground color, heavily marbled and mottled with gold and black. Upper one-fourth pure gold,



streaked upward and toward the edge with flecks of black. Very narrow unbroken pupil ring, gold on upper fourth, and orange on lower three-fourths. A broad streak for 10 mm., back of eye bluish iridescent black. From gape and back along the upper edge of the ten anterior ventrals a series of large spots of bright red.

Coll. No. 3112: 2350 mm. This large specimen is very dark red, with all labials and chin shields red, the post ocular black streak lost in the dark red, and the pale upper part of the iris darkened to a grayish-cream.

Coll. No. 527: 535 mm. Head and back chromium green, becoming dark greenish-glaucous on sides of body and malachite on sides of face, and cobalt on upper labials. First few lower labials touched with beryl green, remainder of lower labials and chin bluish-white. Ventrals pale Nile blue, becoming deeper and strongly tinged with olive toward the tail. All body scales edged with translucent dark gray. Pupil rim brilliant buffy white. Iris, cartridge buff above, much whiter and more brilliant below. Anterior of iris covered with brownish stippling, arranged in faint streaks. This stippling irregularly surrounds the pupil, resolving into upwardly-converging streaks above, and irregularly streaking below.

Coll. No. ....	3294	3554
Total length (mm.).....	340	512
Tail (mm.) .....	124	165
Jaw (mm.) .....	10	
Eye diameter (mm.).....	2.5	7
Ventrals .....		165
Subcaudals .....	137	122
Weight (grams) .....	2.5	

Coll. No. 2669: 571 mm. This young specimen is colored almost like No. 2669 except that the vertebral stripes are almost invisible, only a faint, much broken line. All the labials are much whiter and the gold of the upper iris is much more diffused. In the present snake the cross bands begin 110 mm. back of the snout, and end 100 mm. from the tip of the tail. There are 30 of these pale centered marks, but on the tail they become very broken and irregular. The skin of this snake was mounted on cardboard on the day it was collected, April 1, 1924, and now, 22 years later, every pattern and color is clear and unaffected.

Coll. No. 3554: 512 mm. Peacock green above, lichen green under chin, and glaucous green on the ventral surface. Gold streaking of iris is very much diffused.

Coll. No. 821: Color Plate 348, 950 mm. There are 38 cross bands on this brown snake, and the anterior red is very strong on chin and sides of anterior body. The ventrals elsewhere are quite white.

*Optical Fundus*: Dr. Casey Wood analyzed

the fundus of the right eye of snake No. 2669 as follows:

Eyeground dark blue gray covered with uneven, brilliant silvery dots. The optic disc is large, round, dirty white, with moss green edges. Only a faint suggestion of opaque nerve fibers is apparent. There is one large vein running from the lower periphery straight up into the papilla where it disappears from view. Two smaller veins, one on either side of it converge and join over the lower end of the disc and then continue as one across the center of the disc to near the upper edge where it again divides, this time into three branches. Near the lower edge of the papilla, under a spot where the two small veins join, is a round dark area which may be a depression in the disc.

*Food*: The stomach contents of five snakes are as follows: (1) A pullet just swallowed in the coop of our Indian hunter, where the snake was captured. (2) One medium *Leptodactylus caliginosus*. (3) Bones of a jungle mouse or young rat. (4) Full-grown *Anolis* and several small mollusks, probably the food of the lizard. (5) A large *Leptodactylus mysticenus*, 53 mm. in length.

Measurements of freshly killed specimens:

	2669	624	2798	3112
	571	1270	1370	2350
	221	380	410	755
	18.5	29	32	40
		7	7	9
	150	147	147	164
	132	95	101	121
	11.2	233.5	277	

*Cloelia cloelia cloelia* (Daudin, 1803).  
(Plate VI, Fig. 20).

*Names*: Black Tree Snake. Masurana (Indian Name).

*Range*: Northern and central South America.

*General Account*: A large, round-bodied, strong and active, arboreal snake. Black or dark gray or reddish-brown above, white or yellowish-white or rarely salmon colored below. Fourteen taken at Kartabo but none at Caripito. These fearless snakes feed on lizards and both poisonous and harmless snakes. They seem equally at home among branches and on the ground.

Coll. No. 643: Kartabo, July 1, 1922, total length 2145 mm. *Color in Life*: Olive brown above, anterior upper labials and below pale salmon. Pupil a wide vertical, iris brown mottled with darker.

Coll. No. 250: Kartabo, September 1, 1920, total length 1595 mm. *Color in Life*: Brownish-gray above, upper labials and below creamy white. Coll. No. 3274: Kartabo, Color Plate 230, July 23, 1922, *Color in Life*:



Above slaty black, upper labials slightly paler. Below yellowish-white. Pupil a wide, vertical slit, iris rich coral red, mottled with darker red.

**Food:** The stomach contents of five snakes were as follows: (1) When chloroformed this individual disgorged a 300 mm. *Ameiva* in general appearance uninjured. (2) Nothing but its own shed skin. (3) One large *Ameiva*. (4) Caught in the act of killing a small *Constrictor constrictor* in the roof of an Indian benab near the laboratory. (5) Two small fer-de-lance in stomach, one partly digested, the other fresh.

Measurements of freshly killed specimens:

Coll. No. ....	3528
Total length (mm.).....	1322
Tail (mm.).....	272
Eye diameter (mm.).....	3.5
Rows of scales.....	19
Ventrals .....	216
Subcaudals .....	83
Weight (grams).....	381.5

bands alternate with each other, but some are opposite but do not join. Ventrals white with large longitudinal, irregular blotches of dark reddish-brown, cleanly outlined. The iris is quite indistinguishable from the jet black pupil.

Coll. No. 3253: Kartabo, May 10, 1920, total length 630 mm., tail 187 mm., ventrals 206, subcaudals 123.

Coll. No. 226: Kartabo, American Museum 18154, July 30, 1920, total length 660 mm., tail 215, head length 9.5, eye diameter 3.5, body width 6, body height 8 mm., ventrals 209, subcaudals 125, upper labials, right 9, left 10, weight 11.5 grams.

	3278	250	643	3274
	1470	1595	1870	2030
	260	276	275	430
	4.5	4	4	4.5
	19	19	19	19
	235	240	220	220
	78	72	60	72
	330	1 1/4 lbs.	1.5 lbs.	2.5 lbs.

***Dipsas catesbyi* (Sentzen, 1796).**

(Plate VI, Fig. 21).

**Name:** Catesby's Snake, Brown-saddled Snake.

**Range:** Guianas, Colombia, Ecuador, Brazil, Peru and Argentina.

**General Account:** A gentle, rather deliberate snake, slender, with rounded head and long tail. Above cinnamon brown with numerous black half-bands, bounded with white on the sides. The markings may be alternate rounded spots, or opposite, or assume saddle shapes. The body is much compressed, strongly keeled along the mid-back. Eye very large and protuberant. Iris black. Half a dozen were taken at Kartabo, but none seen at Caripito. All were climbing among slender branches in low jungle growth. In size we found it ranging only between 530 and 645 mm. over all.

**Measurements and Color in Life:** Coll. No. 240b, Kartabo, April 27, 1919, total length 590 mm., tail 150 mm., ventrals 173, subcaudals 97. In preservative this individual has changed to light brown saddles and pale pinkish flesh color elsewhere.

Coll. No. 3293: Kartabo, August 31, 1920, total length 600 mm., tail 176 mm., ventrals 178, subcaudals 94, weight 15.4 grams. In this specimen the dark bands are reddish chestnut.

Coll. No. 149: Kartabo, American Museum 18153, Color Plate 176, July 23, 1920, total length 620 mm., tail 150 mm., eye diameter 3, body width 7.8 mm., body height 11 mm., ventrals 180, subcaudals 91, weight 15 grams. The head is black with irregular bluish-white markings, with a narrow nuchal band just back of gape snuff brown. Dorsal surface tawny brown with about 40 half-bands of blackish-slate. Most of these

**Color in Life:** The head is variegated with white, chiefly in the form of an imperfect band around the snout and a collar back of the parietals. Much of the side of the face is white, also chin and throat except 3d, 4th, 5th and 6th lower labials and two central spots which are black. The first three narrow dorsal bands, dividing the very elongate black saddles, are white, and in the next four the bands become medially tinged more and more strongly with brown, until from the 8th on the usual pattern of a white-edged brown band is seen. There are 41 black saddles altogether. Below, brownish-white, marked with irregular, longitudinal spots of brown. The dorsal saddles, in this specimen, result in a close approach to the pattern of *Dipsas indica*.

**Food:** The food of No. 243 consisted of three small snails and an equal number of newly emerged, soft-bodied wood roaches.

***Dipsas indica* (Laurenti, 1768).**

(Plate VII, Figs. 22 and 23).

**Name:** Snail-eating Snake.

**Range:** Guianas, Colombia, Ecuador, Peru, Bolivia, Paraguay, Brazil and Argentina.

**General Account:** Only three specimens of this little snake were taken at Kartabo and none at Caripito. It is a slender, narrow-necked, round-headed serpent, with many black saddles along the body framed in tawny brown, and a black and white head. It is slow in movement and with large eyes, active both in daylight and at night. In disposition it is exceedingly gentle and wholly unresentful of handling. All were taken among branches in second growth jungle.



*Measurements and Color in Life:* Coll. No. 76, Kartabo, American Museum No. 18179, May 12, 1916, total length 648 mm., ventrals 205, subcaudals 120. Above, this specimen was brownish-gray, whiter toward head, with numerous very large saddles of black.

Coll. No. 2678: Kartabo, Color Plates 685 and 686, April 8, 1924, total length 620 mm., tail 190, head length 11.5, head width 7.5, eye diameter 2.6, body width 5.5, body height 9 mm., rows of scales 13, ventrals 198, subcaudals 115, weight 7.7 grams.

*Food:* (1) 5 small land snails, swallowed whole with a few bits of shell. (2) A mass of soft tissue, probably slugs, and 2 ants.

*Dipsas variegata*

(Dumeril and Bibron, 1854).

(Plate VII, Figs. 24 and 25).

*Name:* Many-banded Snake.

*Range:* Guianas, Colombia and Brazil.

*General Account:* Only four of these little snakes were taken at Kartabo, and none at Caripito. All were found coiled up in the day time low down in the débris of bamboo clumps. They are light brown above and creamy white below, with numerous, broken dark brown or black bands extending almost around the body. On the lower sides

Coll. No. ....	2670	247
Total length (mm.) .....	385	451
Tail (mm.) .....	100	96
Eye diameter (mm.) .....	2.5	3.5
Rows of scales .....	17	15
Ventrals .....	175	174
Subcaudals .....	99	95
Weight (grams) .....	5.2	

each of these expands into a large, rounded spot occupying a lateral third of one or two ventrals. The eye is very characteristic. The pupil is a broad vertical oval. The iris is greenish-yellow, heavily dotted with reddish-brown on the upper half, less densely below.

*Measurements and Color in Life:* Coll. No. 347, Kartabo, Color Plate 292, January 13, 1921, total length 300 mm., tail 75, head length 7, head width 6, body width 6, body height 8 mm., ventrals 180, subcaudals 84. General color above and half down sides mouse gray with two black patches on back of head. Upper head scales mottled with black. Labials and face scales edged irregularly with black. Entire length of body banded with about 50 transverse bands, some broken, considerably separated on ventral surface. Between these are fainter, more broken series of black spots. On the lower lateral surface all these end in a black spot. Ventral surface pale yellow becoming whitish toward tail.

*Eye:* Pupil broadly vertical, less slit-like than in wholly nocturnal snakes. A pale gold rim around pupil. Iris with a ground color of ivory yellow or gold, lighter toward outer rim. This is heavily dotted with red brown on the upper half, dying out toward the lower part of the iris and internally, leaving considerable clear yellow on the inner and lower portions of the iris.

Coll. No. 649: Kartabo, male, August 18, 1922, total length 637 mm., eye diameter 3.2 mm, ventrals 175, subcaudals 89, weight 22.3 grams.

*Dryadophis boddaerti boddaerti*

(Sentzen, 1796).

(Plate VII, Figs. 26 and 27).

*Names:* Checkered Jungle Snake (young), Brown Lined Snake (adult).

*Range:* Northern half of South America.

*General Account:* Medium-sized, slender snake, almost altogether terrestrial. Young, brown or gray, checkered on back and sides, and with variegated pattern on head. Adult, plain brown or gray above with two longitudinal pale lines. Iris golden in upper fourth. Not rare; active and in captivity biting at every opportunity.

*Measurements of freshly killed specimens:*

Coll. No. ....	2670	247	528	787	2743	301	283
Total length (mm.) .....	385	451	475	618	1190	1352	1410
Tail (mm.) .....	100	96		138	320	310	290
Eye diameter (mm.) .....	2.5	3.5			5	5	6
Rows of scales .....	17	15	17	17	17		
Ventrals .....	175	174	176	188	182		
Subcaudals .....	99	95	97	108	101		
Weight (grams) .....	5.2			50	155	87.3	115.6

*Color and Pattern in Life:* Young checkered snakes are brown or grayish-black above, with many cross bands of white or pale drab on the body, tail uniform. These bands are narrower than the inter-spaces and confined to the dorsal scales. On the sides there is a corresponding series of white bands, but alternating with the dorsal ones. The top of the head is mottled with light and dark brown, and the labials and anterior lateral scales are boldly marked with black and white. Below, whitish mottled on anterior ventrals and on sides of remainder. Iris mottled red or red brown on the lower three-fourths, golden or pale orange above. Total lengths 285 to 450 mm.

Individuals of intermediate size have the dorsal pattern more or less distinct, giving way to a uniform brown or grayish-brown, with traces or a half-developed pale lateral lines.

In the adult snake the pattern is a uniform brown or gray brown above with two distinct paler lateral lines extending the full length of the body. Whitish or grayish-



white below in Kartabo specimens. In all Caripito adults the ventrals are sulphur or bright yellow.

#### *Individual Patterns.*

Coll. No. 247: Kartabo, Color Plate 192, August 6, 1920, total length 451 mm. Top of head bone brown, each scale narrowly margined with dark apple green, sides of head lighter green shading to bluish-white on upper labials. First to fifth upper labials irregularly edged with black along posterior borders, a large round spot on posterior half of sixth and anterior half of seventh. A wide band of brown on eighth extending upward to black center of occipitals. Chin shields and ventral surface bluish-white, anterior half of every ventral pearl gray. Dorsal body brown with 39 narrow, transverse bands of cinnamon buff edged with black, ending abruptly at tail. Tail fuscous above, smoke gray below. Iris, lower four-fifths rich red brown, upper fifth lumiere green.

Coll. No. 30, 196: Caripito, August 21, 1942, total length 285 mm. Quite similar to No. 247, except that it wholly lacks the cephalic green, the top and sides of head being coarsely mottled in shades of brown. A continuous but irregular band of white extends from eye to gape.

Coll. No. 2636: Kartabo, Color Plate 650, March 1, 1924, total length 375 mm. Differs from typical juvenile pattern of No. 247 in lacking all green on head, and in having body pattern strongly contrasting brownish-black and white, and in having the superior fourth of iris silvery.

Coll. No. 2670: Kartabo, April 1, 1924. Differs from No. 247 in having essentially seal brown ground color with pale brown markings. Throat heavily mottled, and checkered pattern more of squares than of narrow bands and rectangles. The dorsal cross bands become more narrow and irregularly oblique on posterior third of body. The preserved skin mounted on cardboard has altered in no way from the colors of life as recorded 22 years ago.

#### *Intermediate Pattern.*

Coll. No. 528: Kartabo, Color Plate 351, April 1, 1922, total length 475 mm. The head is olive brown above, deepening on sides to sepia along top line of upper labials. All labials and chin bluish-white, while the anterior upper and all lower labials are edged with slate color. Sixth to ninth upper labials have irregular splotches of gull gray, which shade into burnt umber on upper edges of eighth and ninth. Top and sides of body hair brown, with faint transverse bands almost as wide as inter-spaces, of snuff brown which terminate along a pale gray lateral line, and alternate with similarly colored square patches on lower sides.

All body markings faintly edged with black anteriorly. The lateral line dies out at mid-body. Ventrals dirty white toward neck, shading back through smoke gray to pinkish-buff. Pupil rim flame scarlet, iris pale gold on upper quarter.

Coll. No. 787: Kartabo, April 19, 1922. General color above saccardo umber, faint drab cross markings, shading to hair brown. Pale lateral line well developed, olive buff on tail. Upper fourth of iris golden, remainder burnt umber mottled with darker.

#### *Adult Pattern.*

Coll. No. 2743: Kartabo, April 27, 1924, total length 1190 mm. Seal brown above with single pair of pale lateral lines. Throat mottled, and extreme anterior and posterior ventrals dominately grayish-blue, with considerable olive buff on mid-body ventrals. In the stretched and preserved flat skin faint traces can be seen on the interscale area of the juvenile dorsal pattern, but this is absolutely invisible in the living snake.

Coll. No. 301: Kartabo, July 23, 1920. Similar to No. 2743 except that there is a faint tinge of greenish-buff on anterior ventrals.

Coll. No. 283: Kartabo, Color Plate 138, June 12, 1920, total length 1410 mm. General color above brown, with a broad stripe down each side of light drab. Upper half of head uniform brown, upper labials light mineral gray, under parts grayish-white. Pupil ring rufous turning to gold at the top. Lower three-fourths of iris pecan brown, upper fourth antimony gold flecked with darker.

Four Caripito adults (No. 30184, total length 880; No. 30275, total length 1055; No. 30276, total length 970; No. 30278, total length 955 mm.) show almost identical patterning and coloring. Uniform seal brown above with faint pale lateral line. Labials and ventrals sulphur or bright yellow, with considerable lateral marking of blue gray. Subcaudals with or without central, irregular dark mottling. Chin and throat with more or less blue gray edging to scales. Black band nostril to eye and eye to gape present or absent.

*Food:* Five of these snakes had eaten the following: (1) One small frog. (2) A very young *Ameiva*. (3) 4 unidentifiable reptile eggs. (4) This snake captured at the base of a stub from which it had just caught and eaten a nestling *Glyphorhynchus*. (5) 3 small frogs and a large scarlet-winged grass-hopper.

*Drymarchon corais corais* (Boie, 1827).

(Plate VIII, Figs. 28 and 29).

*Names:* Yellowtail, Tiger Snake, Rat Snake, Black-and-yellow Jungle Snake. Cribó, El Tigre, Raba Amarilla (Native).



**Range:** South America, south to tropical Brazil, Paraguay, northern Argentina and Bolivia.

**General Account:** A large, fierce, terrestrial snake, black variegated posteriorly with yellow. Rare at Kartabo where we recorded only three in eight years. More common at Caripito where 12 came to our attention and six were captured. Several were killed on the road by cars. In the jungle it was necessary to fire instantly to obtain a specimen, for otherwise the speed of the reptile gave but a moment's glimpse. Several snakes were longer than eight feet, and the largest measured nine feet, eight inches. A shed skin, complete except for part of the tail, was a full eight feet six inches. In eastern Venezuela there is a wide-spread belief that if a pregnant woman encounters one of these snakes she will be beaten by its tail and her child will be delivered at once.

Coll. No. 30086: Caripito, Color Plate 1567, May 5, 1942, total length 2540 mm. (8 feet, 4 inches), head 62, eye diameter 8, snout 22 mm., weight 8 pounds. *Color in Life:* Above blue black as far back as 600 mm. before the tail, when the dorsal ground color changes to empire yellow and then to warm orange. The black is continued in this yellow area as paired bands. After four of these pairs, the bands begin to degenerate, diminishing in width and purity, but they continue in a succession of about 30 to the tip of the tail. The rostral, nasals, internasals, loreals and all the upper labials are ivory white, with a flecking of black on the loreals and 6th, 7th and 8th labials. This white color continues on the chin, throat and ventrals, each of the latter with an invasion of black from each side, never meeting in the middle. The subcaudals are yellow orange like the upper side. The iris is dragon's blood red with a gold pupil ring.

Coll. No. 30144: Caripito, June 18, 1942, total length 1448 mm. (four feet, 9 inches). The pattern and color in general are very similar to those of No. 30086, but there is less white on the snout and upper labials.

**Food:** Five yellowtails had eaten the following: (1) A medium sized opossum and 2 *Ameivas*. (2) 2 young opossums and an eighteen inch fer-de-lance. (3) 3 *Leptodactylus* frogs. (4) 1 *Bufo marinus* and a spiny rat. (5) 2 spiny rats.

*Erythrolamprus aesculapii* (Linnaeus, 1758).  
(Plate VIII, Figs. 30, 31 and 32).

**Names:** False Coral Snake, Necklace Snake.

**Range:** Northern and central South America.

**General Account:** Brilliantly hued, tri-colored snakes of rather small size, found

crawling through the jungle or occasionally dug up a foot or more beneath the surface. Not nearly as common as the true coral snakes which they so much resemble. In three instances *Erythrolamprus* was taken within a few feet of a *Micrurus* individual. Typical coloring of a dozen or more Kartabo snakes, a succession of 13 to 18 tri-annuli (two black and one white ring), separated by scarlet. The white bands are narrow and of even width, the black bands are wide above and narrow below, the scarlet bands are narrow above and wide below. I found none with single black bands, and no yellow ones. All the snakes taken at Caripito had each black band split in two by intrusive white bands, sometimes equal to the black in width, and the scarlet bands were much wider than in the Kartabo specimens. The largest snake of this species was 26 inches in total length. Individuals varied greatly in disposition, some being active and irritable, and others quiet, permitting any amount of handling.

Measurements of freshly killed specimens:

Coll. No. ....	259	258	2973	254	256
Total length (mm.)	253	393	540	545	545
Tail (mm.)	31	52	90	66	74
Eye diameter (mm.)	2.5	2.5	3	3	3
Ventrals	189	189	187	186	191
Subcaudals		49	46	42	45
Weight (grams)...	4.6	12.8	56.5	33	30.2

Coll. No. 256: Kartabo, Color Plate 160, figs. a and b, July 2, 1920, total length 545 mm. *Color in Life:* Fourteen scarlet bands, each set off by a pair of black and a pair of white. The bands are ivory white and flame scarlet. Black and scarlet equal in width above (about 12 mm.), white narrower (about 5 mm.). Iris blackish-brown, almost indistinguishable from pupil.

Coll. No. 258: Kartabo, Color Plate 160, fig. c, July 16, 1920, total length 393 mm. *Color in Life:* Thirteen scarlet bands, equal to the black above (about 9 mm.) and widening to twice that width below. White bands 4 mm. above, slightly wider below. Black 9 mm. above narrowing to 4 mm. below.

Coll. No. 254: Kartabo, August 24, 1920, total length 545 mm. *Color in Life:* Thirteen scarlet bands, and a scarlet tail tip. Scarlet very wide, 15 mm. above, 20 to 23 mm. below, wider than black. White strongly black-tipped. Rostral, anterior labials and chin shields tinged with apricot buff.

Coll. No. 259: Kartabo, April 16, 1922, total length 253 mm. *Color in Life:* Thirteen scarlet bands, and thirteen black-bounded white bands excluding the incipient one on the head. Head black with broad band of pale grass green from gape almost to orbits, extending clear across head above.



Snout buffy brown, first two labials and anterior chin shields warm buff. The usual white bands are, on this individual, grass green tipped with gray. Iris dark cinnamon brown.

Coll. No. 2973: Kartabo, Color Plate 767, June 17, 1924, total length 540 mm. *Color in Life*: Fifteen pairs of black paired bands, wide above, narrowing below to two to four ventrals. These black bands are separated by narrower bands of pale grass green, somewhat wider on the ventral surface (one and a half to three scales wide), and above with jagged edges dovetailing with the black. The inter-spaces are orange red, narrower than the black rings dorsally, but below, widening out abruptly to a maximum of seven ventral scales. The cephalic black pair is incomplete, the pale central band covering the occiput, and dying out at the labials, the anterior black ring being very small, extending across the orbits and ending in an irregular line along the mouth. The snout, all lower labials except the posterior two and under chin and neck are solid orange red. The pale ring of the thirteenth pair covers the anal region, the fourteenth the central portion of the stumpy tail, and the last, very much reduced, extends almost to the tip, leaving a tiny speck of scarlet at the extreme end. Iris very dark rich brown.

Coll. No. 334: Kartabo, May 28, 1920, total length 456 mm. 18 annuli. No. 335: Kartabo, June 21, 1920, total length 475 mm. Very dark specimen, all red scales black tipped. 18 annuli. No. 335a: Kartabo, June 25, 1920, total length 502 mm. 18 annuli. A scattering of whitish scales mixed with some of the black.

Coll. No. 30008: Caripito, Color Plate 1511, March 10, 1942, total length 524 mm. 15 annuli. Black bands split into equal parts by intrusive white bands. No. 30143: Caripito, June 18, 1942, total length 365 mm. 16 annuli. Black bands equally divided by white, making four black and three white to each annulus. Very dark colored snake.

*Food*: (1) Remains of small snake, 2 large crickets. (2) 150 mm. *Atractus trilineatus* in fairly good condition; indeterminate mass which may have been an amphibian. (3) Very small *Micrurus* half digested. (4) Small lizard too far gone for identification. (5) Half digested *Tantilla longifrontale*, and two small *Synbranchus*.

#### *Helicops angulata* (Linnaeus, 1758).

*Name*: Brown-banded Water Snake, Water Labarria.

*Range*: Northern half of South America.

*General Account*: *Helicops* was not found at Caripito, and was rare or else difficult to detect at Kartabo as only four are in the records. It is apparently rather aquatic in habits as two were seen swimming in the

Cuyuni River. A third was captured in 1916 and sent north to the Zoo. A fourth killed in the jungle had an indeterminate mass of fish scales in its stomach.

Coll. No. 3266: Kartabo, May 10, 1922, total length 870 mm., tail 225 mm. In general its pattern was olive gray above with numerous wide, dark brown transverse bands. Below it was straw yellow with a checker-board pattern of alternate squares of dark brown.

#### *Hydrops triangularis* (Wagler, 1824).

*Names*: Red-and-black Banded False Coral Snake. Pung-gak, "living in ground" (Akawai Indian).

*Range*: Guianas, Amazon valley, southern Colombia.

*General Account*: Small burrowing snake, red-and-black banded above, white below, living in close association with *Erythrolamprus* and *Micrurus*. Several were caught crawling through jungle in the rainy season, and eight were taken in a single rice field, in company with the two above mentioned species. All were feeding on *Synbranchus*. Locally common at Kartabo, but not observed at Caripito. These are slow moving, non-biting, dark-loving snakes.

Coll. No. 244a: Kartabo, Color Plate 88, March 24, 1919, total length 440 mm., ventrals 171, subcaudals 60. *Color in Life*: Seventy-three series of patterns. Below, the ground color is pure white, with two series of dark brown blotches close together, sometimes opposite, sometimes alternate. These narrow suddenly and extend upward as scale-width vertical bands, not quite meeting on the mid-back. The back is red brown, while between each of the lateral, vertical lines is a conspicuous spot of bright coral red, suffusing from three to five scales over two rows.

The head has four irregular cross bands of black, with inter-spaces, counting from the snout backward, of pale brown, dark brown, dark red and bright red. The succeeding nuchal band of black almost meets above, and is the broadest on the whole snake. The head is small and the eyes inconspicuous, the iris reddish. The general impression of the lateral pattern is of successive layers of red-brown, bright red and white, cut by numerous vertical black bands.

This and seven other specimens were captured in one ploughed, marshy rice field. In the present specimen there were two *Synbranchus* in the stomach, one partly digested and the other quite fresh and 70 mm. in length. All eight *Hydrops* had from one to three *Synbranchus* eels in their digestive tract.

Coll. No. 3261: Kartabo, March 26, 1919, total length 385 mm., tail 83 mm., eye diam-



1.2 mm. *Color in Life*: Seventy-one black annuli, some alternate, some joined to make a "Y." Rufous red above changing to bright red on the sides and to white below. The black bands are narrow above and widen abruptly below, where the white interspaces are of only two scales width.

Coll. No. 3292: Kartabo, March 26, 1919, total length 427 mm., tail 80 mm. *Color in Life*: Reddish above, changing into coral on sides. The dorsal markings are rather atypical of this species, consisting of alternate narrow black bands which barely reach the middle line. Each band widens on the sides and below, until the ventral aspect is of alternate triangles of black, two scales apart, and with bases separated from each other and across the mid-line by white. The ventral aspect of this snake is decidedly darker than the dorsal.

*Imantodes cenchoa* (Linnaeus, 1758).

(Plate VIII, Figs. 33 and 34).

*Names*: Thread Snake, Night Climber, Chunk-headed Snake.

*Range*: Mexico and Central America and South America south to Paraguay and northern Argentina.

*General Account*: A very long, attenuated snake, with short, thick, enlarged head and enormous golden eyes with vertical slit pupil. Pinkish-brown with numerous large saddles of dark brown. The eye has a decided forward and downward slant, the angle with the mid-snout line being 43 degrees, doubtless an adaptation for nocturnal pursuit. None seen at Caripito, five at Kartabo. Found by accident coiled in masses of leaves or debris in parasitic plants. Active at night, twice entering laboratory, once in pursuit of a *Hyla rubra*.

When caught it was very active, tying itself into knots, and with considerable power of compression. It gave forth, from the anus, a most evil-smelling liquid.

Coll. No. 329: Kartabo, Color Pate 232, August 7, 1920, total length 1025 mm. (40.5 inches), tail 255, head length 12, head width 9, neck width 4, body width 5, eye diameter 3.5 mm., weight 18.5 grams. *Color in Life*: General color above sandy brown, snout and sides of head vinaceous buff with a slight yellowish tinge. Six or eight large, symmetrical patches on top of head, and about seventy large, diamond-shaped dorsal body saddles of chocolate brown. On the posterior half of the body these break on each side into a small lateral spot. Throat and lower labials pale grayish-buff, becoming speckled on the ventrals and shading to gray on the tail. Pupil a narrow, almost vertical slit, with a backward superior inclination. Iris golden, with irregular indistinct fleckings and streaks of orange and golden

brown. Two narrow lines of light yellow along both sides of the pupil, and a small patch of dark brown at top and bottom.

Coll. No. 346: Kartabo, August 16, 1922, total length 1190 mm. (47 inches), tail 380 mm., head length 14.5, head width 8.5, eye diameter 4 mm., rows of scales 17, ventrals 286, subcaudals 168. This specimen had ninety-eight brown saddles. A much darker snake than No. 329.

*Leimadophis reginae* (Linnaeus, 1758).

(Plate IX, Fig. 35).

*Names*: Reticulated Snake.

*Range*: Panama, Colombia, Ecuador, Peru, Venezuela, Guianas, Trinidad and Brazil.

*General Account*: Found both at Caripito and Kartabo, four specimens at the former, and six at the latter locality. It is an active snake of medium size, well able to climb but usually found on the ground. Olive or bright green or lemon yellow above, with black edges to the scales giving a strong reticulated appearance. Below pale buffy yellow or bright empire yellow (Kartabo), or dominately scarlet (Caripito), both phases strongly and irregularly marked with black spots.

In temperament this snake is usually timid, making no effort to bite, but with ceaselessly flowing tongue. It is strong for its size and when its head was being drawn never ceased to constrict with its entire body. When angered, the head is raised and the neck flattened and widely expanded, becoming a cobra in miniature.

Coll. No. 270: Kartabo, Color Plates 126 and 132, June 7, 1920, total length 580 mm. (23 inches), tail 155 mm., weight 26.7 grams. *Color in Life*: Above serpentine green, brightening to light cress green toward head, with large, indistinct, dark reticulations along the back, and a line of large, distinct dark spots down each side, merging into a solid, black, lateral line from 50 mm. in front of vent to tail tip. Beneath, the head is light buffy yellow, deepening to mustard yellow below tail. From the neck to vent, a series of transverse, blue black bands or half-bands occupies the entire width of the ventrals. An average of every fourth scale is clear, unmarked yellow, and a larger number of half, alternating bands than of whole ones. Ventral tail unmarked yellow. Iris, lower four-fifths light mahogany red, mottled and lined with darker. Upper fifth, slightly forward of center, capucine yellow almost clear.

Coll. No. 284: Kartabo, July 20, 1920, total length 608 mm. *Color in Life*: General color above olive, reticulated with dark brown. Top of head fuscous, head markings



cedar green, lateral neck scales parrot green. Labials, chin, throat and anterior ventrals pale ochraceous buff. Posteriorly the ventrals are mottled more and more with pale salmon, deepening and changing to aniline yellow on subcaudals.

Coll. No. 291: Kartabo, October 6, 1920, total length 811 mm. *Color in Life*: Head brownish-olive, deepening toward snout. Two median patches of dark lettuce green directly back of eyes, below which are patches of cinnamon brown. A narrow line of black extends along top of upper labials, and back from eye to point of mouth, and down a few scales of the neck. Labials, throat and anterior neck pale ochraceous buff ground color, shading through buffy olive to grayish-olive on tail. Down the back are faint criss-cross markings of dark brown, surrounding faint, irregular whitish spots, which extend in a double dorsal row. Sides tinged with gray and with about 53 spots of dark brown, which merge into a narrow lateral line on tail. Ventrals salmon buff with blue-black markings; subcaudals chamois. Iris with upper fourth straw yellow, lower three-fourths mottled pecan brown. Pupil rim gold above, orange rufous below.

Coll. No. 2976: Kartabo, June 17, 1924, male, total length 2320 mm., tail 60, eye diameter 2.5, body width 6 mm., rows of scales 17, ventrals 139, subcaudals 49, weight 6.5 grams. *Color in Life*: Although only nine and a quarter inches in length this young snake is exactly like No. 291, except that the body and tail above are bone brown throughout, and the faint dorsal spottings are very obscure. Also the anterior ventral scales are pinkish-buff, shading back to cinnamon on posterior half of body, and to honey yellow under tail.

Coll. No. 30075: Caripito, Color Plate 1562, April 30, 1942, total length 570 mm., tail 85, head 16.2, snout 6.5, eye diameter 4.5 mm., weight 52 grams. *Color in Life*: Above dull lemon yellow on basal half of each scale, with the distal half or a very wide margin black. Some scales marked with lateral margins of scarlet. Below, from the tip of lower jaw to the ninth ventral bright lemon yellow, from the ninth back gradually replaced from the center outward with bright flame scarlet, the yellow on the extreme lateral edges soon merging with the greenish or lemon of the dorsal scales. The ventral scarlet irregularly marked laterally with black lines, not quite forming cross bands. At irregular intervals an entire scale may be pearl gray, about ten of these in all. Just before the anus the black dies out and the scarlet persists to the tip of tail. Top of head olive green, variegated with black, a broad band of black extending back from the eye to the last head scale. Upper labials

bright yellow, extending back beneath the lateral black head band. Iris gold on upper fourth, rich chestnut below, marked laterally with black. It was a female and contained many small, undeveloped eggs, about 1 mm. across. In the body cavity was a four-inch tapeworm.

Coll. No. 30131: Caripito, June 8, 1942, total length 506 mm., tail 148 mm. *Color in Life*: Above dark gray, edged on each scale with black, appearing wholly black in general. Labials, chin and anterior ten ventrals straw yellow. Rest of body ventrals coral red, changing under tail to rich salmon. Ventral chin, neck and tail immaculate. The rest with a black pattern of alternating squares of one scale width, with alternating transverse narrow lines, extending to right or left of the squares.

Coll. No. 30139: Caripito, June 3, 1942, total length 568 mm. *Color in Life*: Bright green and black above. Below red, with the black markings limited to narrow cross lines, except on posterior half of body where a medium black thickening on the ventrals is seen.

Coll. No. 30216: Caripito, May 3, 1942, total length 195 mm., tail 51 mm. *Color in Life*: Almost uniform brown above. Red collar across nape and an imperfect collar-like marking from eye obliquely back from gape. Pink below, irregularly marked.

*Food*: No. 291 had swallowed two frogs and a small bird. No. 2976 was caught attempting to eat a very small, 28 mm., frog with half-absorbed tail which it had just caught in a jungle pool. No. 30075 had eaten a *Hyla rubra*. No. 30139 had a 190 mm. *Ameiva* in its stomach.

***Leimadophis taeniurus bipraeocularis***

(Boulenger, 1903).

*Names*: Side-spotted Snake.

*Range*: Colombia and Venezuela.

*General Account*: This species is represented by a single, very young specimen picked up in a jungle trail at Caripito on June 24, 1942. In total length it is only 125 mm., with a tail of 27 mm. It is red brown above, with rostral, labials and all under parts pale yellow. There is a deep yellow scallop on the side of the neck which bites into the dorsal brown, and back of this a round spot is pinched off from the dorsal color. These spots continue posteriorly, spaced closer and closer together until, on the posterior third of the body and on the tail, they merge and form a solid, distinct lateral line.

***Leimadophis typhlus* (Linnaeus, 1758).**

*Names*: Pink Ground Snake.

*Range*: South America in general.

*General Account*: A short, thickish snake,



dark green above and lemon yellow below, or dull pink above and bright pink below. I have observed no gradations in life between these phases. In preservative the colors alter radically or are completely lost, and even in dried skins the green changes to dark olive. From the point of view of human observation this is a gentle snake, allowing handling and not attempting to bite. When striving to escape or when teased, it raises the head to some distance and flattens the neck, making it look twice natural size. Even when thoroughly alarmed it progresses only by rather slow undulations, as we might expect from the short, thick body. I have never been able to persuade it to any swiftness or quickened progress. This is one of the very few jungle snakes which are terrestrial and yet, at least in one color phase, green in color. *L. typhlus* was not observed at Caripito, but seven were collected at Kartabo, three in the green phase, four in the pink.

Measurements of freshly killed specimens:

Coll. No. ....	2785	2834	332	624
Total length (mm.)	175	425	545	585
Tail (mm.) .....	38	102	106	100
Eye diameter (mm.)	3	4.5	4.5	5
Rows of scales....	19	19	19	19
Ventrals .....	167	145	140	147
Subcaudals .....	53	53	53	50
Weight (grams)...		44	44.2	85

Coll. No. 332: Kartabo, Color Plate 233, September 14, 1920, total length 545 mm. *Color in Life*: Above elm green, shading laterally through parrot green to lemon yellow. Upper labials mineral green, shading back to chalcedony yellow. Lower labials and throat strontian yellow. Ventral surface primuline yellow, with a light grayish-pink reflection. Iris, upper fifth pinkish-buff with dark brown flecks, remainder dark red brown. Distinct pupil rim bittersweet orange, with upper fifth orange buff.

Coll. No. 624: Kartabo, June 17, 1922, total length 585 mm. A female containing five eggs, apparently full sized but without shell, round-ended ovals, 7 by 17 mm. This snake was in the pink phase.

Coll. No. 2642: Kartabo, Color Plate 654, March 15, 1924. *Color in Life*: General color above dull pink. Head above brown with a greenish cast, snout and sides of head olive. Lower labials pale pink. The dorsal pink shades laterally into vinaceous, with the ventrals a brighter pink than the back. Faint dark, oblique stripes show here and there along the sides as the snake bends laterally. The center scales of the distensible hood on the neck have half hidden white streaks on their anterior edges, set off by similar streaks of salmon. Iris brilliant orange in upper quadrant, the rest dark brown with a red tinge.

Coll. No. 2834: Kartabo, May 21, 1924, total length 425 mm. Adult male in breeding condition, testes 21 mm. *Color in dried skin*: The mounted skin of this specimen has altered from the living green to olive green above. The anterior three-fourths of the body has been stretched in mounting and this artificial distension reveals a pattern, wholly concealed in the living snake. This pattern consists of about thirty inverted Vs with the arms directed backward from the mid line. These are made by the separation of scale rows in pairs, two rows of the olive green scales set in dark skin background, then two rows set in yellow skin bases. The stretching is to the extent of one-fifth, the total length in the freshly killed snake being 425 mm., and in the mounted skin 530 mm. The V-shaped marks become visible in the living snake only when it distends its neck in the terrifying attitude which it assumes when thoroughly frightened.

*Food*: Three of these snakes had fed on frogs, one on a 47 mm. *Leptodactylus mystacinus*. No. 2834 had swallowed a small frog and, rather surprisingly, a mass of more than one hundred good-sized ants, not the disturbed food of the frog.

#### *Leptodeira annulata annulata*

(Linnaeus, 1758).

(Plate IX, Fig. 36).

*Names*: Saddle-back Snake, Annulated Night Snake.

*Range*: South American south to and including Paraguay and northern Argentina.

*General Account*: One of the commonest small snakes at Kartabo, where upward of two dozen were observed. Only two were collected at Caripito. One specimen measured 900 mm., but all others were well under this measurement. This snake is nocturnal, as indicated by its narrow, vertical pupil. When disturbed or alarmed it gives off a very offensive odor, but almost never attempts to bite on capture. It spends the day curled up under the loose bark of fallen logs or in crevices of bark as high as six feet from the ground. It seems to prefer swampy localities and several times I found it actually in jungle pools.

In general the color above is pale cinnamon buff with a series of large irregular spots down the back. These are found in all shapes, sometimes fairly evenly rounded, or confluent in zigzags or actual cross bands. Every type may be found in one snake. A black post orbital band and buffy or whitish ventrals are generally characteristic. The number of saddle markings varies from 38 to 76.

Measurements of freshly killed specimens:



Coll. No.....	235a	347	235b	2875	333
Total length (mm.)	210	312	375	470	900
Tail (mm.).....	50	75	100	148	225
Eye diameter (mm.)	2	3	3	4	5
Rows of scales....	21	23	19	21	21
Ventrals .....	192	201	193	196	189
Subcaudals .....	83	91	100	87	88
Weight (grams)...	2.2	3.5	6.5	29	48

Coll. No. 347: Kartabo, Color Plate 140, figs. a and b, June 12, 1920, total length 312 mm. *Color in Life*: Darker than the general run of this species. Head above olive brown, body tawny olive, spots blue-black. Throat, chin and a few anterior ventrals gray, remainder of ventrals vinaceous buff. Series of dorsal spots round and oval, four or five, merged together or alternate, about 76 in all. A line of small, round, black dots down each lateral line, alternating with the dorsal saddles. Pupil a narrow, vertical slit. Iris pecan brown flecked with gold. Caught in tent pursuing a small frog.

Coll. No. 235a: Kartabo, June 27, 1920, total length 210 mm. Much paler and grayer than usual. General color above pale drab, ventrals lighter. Top of head and dorsal spots dark gray. About 62 spots, saddles and bands along back. Iris gray. Taken in shallow water in an old tank, sharing the space with hundreds of very small tadpoles.

Coll. No. 333: Kartabo, Color Plate 140, fig. c, September 24, 1920, total length 900 mm. *Color in Life*: Above cinnamon brown with about 62 blue-black markings, mostly saddle-shaped, occasionally joined together. Sides of head and snout tawny with a streak of mummy brown from eye to angle of jaw. Below this a streak of orange buff, tinging the upper part of the anterior ventrals. Labials, throat and ventral surface light buff with faint mottlings of mineral gray. Iris orange rufous, lighter around the pupil and streaked with dusky. Caught under bark, six feet from ground. It was coiled in intimate association with a mass of termites and a large whip scorpion.

Coll. No. 30,152: Caripito, June 24, 1942, total length 585 mm. *Color in Life*: Pale brown above with dorsal markings of dark brown. On the nape there are two short, thick, longitudinal bands, then four pairs of alternating short bands, changing into more or less rounded spots. Some of these are double, others dumbbell-shaped, a few yoked three together. They continue to the tip of the tail but are fainter beyond the anus. Sides with a series of faint, brown, short, longitudinal lines. Below pale yellow brown. Iris dull golden brown. Caught swimming across a small jungle pool.

*Food*: Three stomach contents were: (1) 2 frogs and 8 tadpoles. (2) 1 tadpole, 1 small *Hyla rubra*. (3) Bones, probably of amphibians, 1 small lizard.

### *Leptodeira rhombifera* Günther, 1872.

*Name*: White-bellied Night Snake.

*Range*: Mexico to northern South America.

*General Account*: A single specimen taken at Caripito represents this species. It was found coiled in a mass of leaves at the base of a jungle tree.

Coll. No. 30,143: Caripito, June 19, 1942, total length 465, tail 90 mm. *Color in Life*: Hair brown above with 42 dark brown spots, large, mostly round or oblong, several yoked together down back of body. These are continued on the short tail but indistinctly. The brown of the sides pales abruptly into the ventral aspect which is immaculate pure white.

### *Leptophis ahaetulla ahaetulla*

(Linnaeus, 1758).

(Plate IX, Fig. 37).

*Names*: Whip Snake.

*Range*: Northern South America.

*General Account*: A long, slender, tree-climbing snake, green or blue, rarely brown above, with usually a dorsal and two broad lateral yellow-brown stripes. Below white anteriorly, changing into pale brown posteriorly, or everywhere below bright yellow (large, Caripito specimens). A black line through sides of head divides the dorsal and ventral colors. Eye golden yellow, with fore and aft black areas continuing the lateral black line of head.

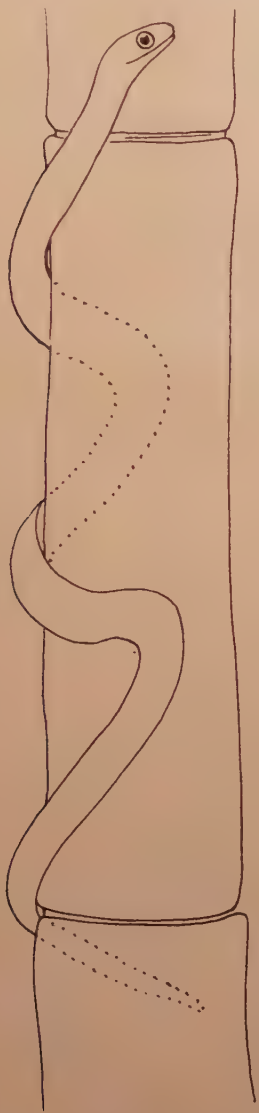
Thirteen specimens taken at Kartabo, two at Caripito and two others seen. All the Kartabo snakes were relatively small, only one reaching 1200 mm., brightly colored above, dull below, and exceedingly slender. All the four Caripito snakes were very large, the two captured being six feet, and seven feet, eight inches respectively. All were dull colored above and brilliant below, and relatively heavy-bodied.

These snakes are excellent climbers and often rest quietly for hours draped over branches and twigs. Six of those taken at Kartabo, however, were hunting on the ground. One had just caught a leopard *Hyla*. It relinquished its hold on the frog in the excitement of being captured, but ten minutes later when placed in a wire cage with the still unhurt frog, it again attacked and this time swallowed the unfortunate amphibian. Two were caught in the laboratory when they dropped from the rafters to the floor.

The small Kartabo specimens were nervous and bit at every opportunity. No. 245, with a total length of 975 mm., when set at liberty for an hour in the laboratory compound, made straight for the nearest bamboo stem and would not be turned aside. It



climbed the stem, which was six inches thick and exceedingly smooth, ascending rapidly by throwing S-shaped coils around half the circumference, and holding on by pressure on opposite sides of the stem. It soon shifted to an adjoining shrub, climbing easily among the slender branches, holding the head and neck raised stiffly, and occasionally swaying them from side to side.



TEXT-FIG. 2. *Leptophis a. ahaetulla*. Snake climbing bamboo.

This head-rearing seems to be a habit. From a level of foliage in a bush-covered clearing a single object projected, and closer examination showed this to be six inches of head and neck of a brilliant green and white

whip snake. It permitted me to approach and actually grasp its neck, but instantly the little serpent became a fiend, seized my finger and so jerked its head from side to side that its teeth tore the flesh and caused a few drops of blood to escape. Unlike the boas it fought until I shut it tightly in a snake bag.

*Color in Life:* Coll. No. 609, Kartabo, Color Plate 398, June 10, 1922, total length 1030 mm., weight 27.6 grams. Head grass green with an indistinct, oval, dark grayish blot on top, between and slightly back of orbits. Back generally grass green with a median dorsal line of cadmium yellow, beginning narrowly on the back of the neck and widening and shading to old gold on tail. All the back scales are shaded on the outer edges with black and are turquoise green on the inner edges, giving a brilliant blue green tinge to the general color. Side of head tinged with chrysophrase and paling to light green about the super orbitals. There is a narrow, lateral, preocular line of black faintly shaded below with gold, running through the base of eye. Behind the eye this becomes wider and stronger and the gold almost covers the eighth labial. The upper labials below this lateral line are bluish-white. The lateral line becomes indistinct black and gold stippling on the side of the neck, widening and becoming light cadmium on anterior sides, widening and deepening again to a broad line of bronze on posterior body and tail. Chin and under neck white with pinkish tinge, becoming more and more heavily shaded with pale pinkish lavender and deepening through buff to dull brownish-lilac on posterior ventrals and tail.

Iris strongly empire yellow around pupil, becoming lighter and greenish toward periphery. Two patches of olive green stippled with darker, small and barely touching iris on left, larger and wider on right, both sides fraying out downward in bright crescents. These dark marks continue the black, lateral head line through the orbit.

The colors of this specimen after twenty-four years of preservation have all gone. It is now dark brownish-black above, leaden blue below, labials, chin and throat pale pink.

The dullest, darkest Kartabo specimen was No. 2763, with a total length of 1132 mm., in which the back was hair brown, with the top of the head, a narrow vertebral line, and two broad lines on the lower sides greenish-blue. The chin and throat were white, and all ventrals steel blue.

Coll. No. 30174 was a six-foot specimen taken in Caripito. I pulled it down as it rested sprawled across the branches of a low jungle growth. When dragged free it struck at me several times but was not



nearly as antagonistic as the smaller Kartabo snakes. It was dark olive green above, with a paler green vertebral line, shading down the sides to the same apple green of the vertebral line, and on down to chalcidony yellow on the ventrals. Below, this color deepened to bright yellow chrome on the whole lower head, the labials, the chin and anterior neck and under tail. In preservative the colors are altered to a uniform brown above, greenish-yellow below.

Measurements of freshly killed specimens (all from Kartabo except the two largest):

Total length (mm.)	356	1035	1132	1252	1310	1835	2340
Tail (mm.)	100	480	460	510	490	690	865
Eye diameter (mm.)	3	4.5	4.5	5	5	9	9
Ventrals	156	152	168	164	153	182	182
Subcaudals	171	170	165	167	161	184	172
Weight (grams)	2.1	25	30	55	55	384	219

***Leptophis ahaetulla orton*** (Cope, 1875).

Name: Keeled Whip Snake.

Range: Venezuela and Colombia.

**General Account:** A single specimen taken at Caripito represents this subspecies. It was climbing slowly and apparently had its eye on a small *Anolis*. Coll. No. 30163; Color Plate 1618, July 1, 1942, total length 1587 mm. (five feet), tail 553 mm. In brilliancy of the upper surface it resembles the small specimens of *Leptophis ahaetulla ahaetulla* taken at Kartabo, but in brightness of ventral yellow it recalls the large specimens of *ahaetulla* captured at Caripito.

In general color above it was turquoise blue from snout to tail tip. The lowermost two or three scales throughout the body, from the gape to the vent, were bright orange, while the labials, chin, throat and ventrals to vent were white. The orange spreads across all subcaudals as well as the sides of the tail. A narrow, preocular black line is continued pigmentally through the iris itself, and on to a stronger black line along the side of the head to the last upper labial. The top and bottom of the iris are bright yellow.

In this specimen, after four years in preservative, all color is lost, the dorsal scales being brown, and ventrals steel blue.

***Leptophis caeruleodorsus*** Oliver, 1942.

Name: Blue-back Yellow-belly.

Range: Northeastern coast of Venezuela, Trinidad and Tobago.

**General Account:** This is the only specimen taken of this species. Coll. No. 30,280: Caripito, July 1, 1942, total length 1216 mm., tail 490 mm. Turquoise blue above, lemon yellow below.

***Liophis breviceps*** Cope, 1860.

Name: Red-bellied Burrowing Snake.

Range: Guianas and Ecuador.

**General Account:** A small, thick-set snake, with short tapering tail and small head and eyes, and burrowing habits. The largest captured measured 22 inches in length. Dark above with many faint, yellow cross bands, red below with numerous black scale-wide cross bands. Little variation among individuals. Four were taken at Kartabo and one at Caripito. One of the former was four inches under ground in

a marshy rice field in company with many *Micrurus* and *Erythrolamprus*, feeding on earthworms. Others were taken among jungle débris, burrowing at the first hint of danger. When handled it was unexpectedly quick and active in motion.

Coll. No. 338: Kartabo, adult female, October 9, 1920, total length 560 mm., tail 95, eye diameter 2 mm., ventrals 161, subcaudals 54, weight 56 grams. **Color in Life:** Dorsal surface brownish-black with about 90 narrow, faint, irregular transverse bands of pale vinaceous buff. Labials, chin, throat and subcaudals creamy white, the latter heavily marked with alternating spots of black. The ventrals are coral red with about 36 broad, black, disjointed cross bands. They are of two or three scales width, and are rarely unbroken, but usually disjointed at the center. Eye small, pupil round and large, no visible pattern on iris. This female contained eight large, oblong, shell-less eggs.

Coll. No. 30,146: Caripito, June 19, 1942, taken on the ground in jungle, starting to burrow at first alarm, total length 206 mm., tail 43 mm. **Color in Life:** Black above with faint yellow markings in indefinite bands. Below, throat pale yellow, changing gradually into bright coral red, paling again at the tail. Black cross bands on ventrals exactly as in No. 338. Very active and quick when alarmed and in the hand.

In this same specimen, when preserved after four years, all the yellow and red colors have vanished.

**Food:** No. 338 had devoured one large and a second smaller earthworm. Another snake had eaten three earthworms, two medium myriapods and a 150 mm. *Synbranchus*.



***Liophis cobella cobella*** (Linnaeus, 1758).

**Names:** Banded Tricolored Snake, Red-bellied Ground Snake.

**Range:** Guiana, Venezuela, Trinidad, Colombia and Brazil.

**General Account:** A small black snake with imperfect, narrow white dorsal bands, scarlet below with broad bands of black; head and tail below whitish, the latter with imperfect black bands. A second color phase is brown above, salmon below, with very faint white and scarlet bands.

Six of these small snakes were taken at Kartabo, the largest eighteen inches in length, and the smallest and most brilliantly colored less than eight. One specimen was captured at Caripito. Few observations in life were made. It is a ground snake, found in the jungle or among bamboo clumps, diurnal, and feeds on small frogs and lizards. The remains of bones alone, prevented any more definite identifications. One specimen (No. 166), under eight inches, was remarkably strong for its size, making no attempt to bite, but pulling hard with its curved tail. When set temporarily at liberty, instead of trying to crawl to safety it actually twisted up the posterior part of the body into a tight, overhand knot, although it was quite uninjured.

**Color in Life:** Coll. No. 166, American Museum No. 18159, Kartabo, June 10, 1920, Color Plate 134, figs. a and b, total length 192 mm., tail 29, head length 8.2, eye diameter 1.75 mm., weight 1.8 grams.

Above blue-black with several complete, narrow whitish bands across the neck, all the ones on the body fainter and hardly meeting. These bands widen abruptly on the sides and change at once to the double ventral coloration, a broad band of carnelian red about three scales wide, succeeded by a black band averaging two scales in width, and so on. Not counting an abortive black band which stops on the posterior side of the head, there are 34 of these black bands. On the tail are 21 imperfect bands of black. The red fades out to seashell pink on chin, throat and lower labials, and the tail becomes abruptly grayish-white. There are 65 dorsal bands of white, including one on the mid-head which ends in two whitish spots on the anterior part of the parietals. Pupil round, iris very dark russet brown, hardly distinguishable from the pupil black.

Coll. No. 219: Kartabo, June 22, 1920, total length 200 mm., tail 41, head length 8.5 mm., weight 2.6 grams. The coloring of this small specimen is very unlike that of No. 166. General color above saccardo brown, more or less regularly barred broadly with dots of black. All labials and throat pale ochraceous buff, shading on ventrals to light salmon, and this on all the main body ventrals to coral red. This fades posteriorly to

buff again. Instead of wide ventral red bands, both the red and the black are narrow and irregular, often only a single scale in width, and usually alternate, not meeting in the middle. The iris has a broad irregular inner band of vinaceous tawny, shading externally to roods brown.

Coll. No. 165: Kartabo, September 14, 1919, Color Plate 254, total length 450 mm., tail 92 mm., weight 26 grams. Head and back above dark olive with faint bands of violet gray, upper labials, chin and throat pale pinkish-buff, ventral surface salmon shading to deeper pink toward head and tail, with about 75 alternating and broken bands of violet gray.

Coll. No. 224: Kartabo, October 12, 1920, Color Plate 134, fig. c, total length 480 mm., tail 90, head length 14, head width 10.3, eye diameter 3, body width 9 mm., ventrals 153, subcaudals 57, weight 24.2 grams. General color above buffy brown flecked with olive brown, paling to deep olive buff on sides. Back with very faint markings of dark brown. Upper labials grayish-olive edged with black. Throat and lower neck pale pinkish-buff with scattered fleckings of black. Ventrals apricot buff paling to colonial buff on tail, and crossed with numerous irregular bands of violet gray. Iris brown near pupil, mottled with dark on outer area.

Coll. No. 30,287: Caripito, April 14, 1942, total length 206 mm. Independent description corresponds exactly with that of No. 166, except that the scarlet is more intense.

***Lygophis lineatus*** (Linnaeus, 1758).

**Name:** Red-striped Snake.

**Range:** Guiana, Venezuela, Colombia, Brazil, Paraguay and Argentina.

**General Account:** A single specimen caught as it was swimming a jungle pool near the Kartabo laboratory. It had eaten three *Hyla rubra*, all very young specimens with tail barely absorbed.

Coll. No. 3563: Kartabo, September 3, 1924, male, total length 453 mm., tail 142 mm. **Color in Life:** Dark brown on head becoming paler toward tail. Three longitudinal stripes, one vertebral, two lateral, bright red extending full length of snake. A bright red brown band from snout through eye to lateral neck. Salmon below.

***Oxybelis aeneus aeneus*** (Wagler, 1824).

(Plate IX, Figs. 38 and 39).

**Names:** Ashy Tree Snake. Whip Snake, Lizard Snake (Creole).

**Range:** Mexico, Central and northern South America.

**General Account:** A very long and slender tree snake, ashy white above, brown below, dark line through eye, throat white. Iris sage green in front and back, white above and below. Fairly common at Kartabo where



a dozen specimens were taken and others seen. Also found at Caripito.

In size my specimens varied from three feet to six feet, three inches. All were found among slender branches in open jungle or near the rivers. The extreme slenderness and the reversed, dorso-ventral pattern of coloring, combined with the irregular draping of the body over branches, and complete immobility, all make them extremely difficult to detect. When disturbed they vanish almost between winks, and the instantaneous dash twenty or thirty feet away leaves the eye completely baffled.

Birds' eyes detect them better than humans', and one snake in tall bamboo was so mobbed by small birds and jays that it fell thirty feet to the ground close to me.

A curious habit is that of protruding the tongue full length, about equal to the length of the head, and holding it motionless. It is lemon yellow for three-fourths of its length and dark at the tip. Whether this slight addition to the serpent's resemblance to irregular twigs is the origin or stimulus of this phenomenon, I cannot say, but I observed it at various times in the same snake and in three other individuals. On April 3, 1922, I caught an ashy tree snake back of the laboratory. Whenever it squeezed a few inches of the attenuated neck free of my hand its tongue appeared full length and "froze" in that position, simultaneously putting an end to all struggling. When several feet of the tail were at liberty, this end of the snake slowly reared upward, and curved around into an amazingly large and complete circle, a full eight inches in diameter. The slender muscles supported the two free and elevated body lengths without apparent effort.

These snakes never made any attempt to bite, but when first caught they frequently emitted from the anus a clear fluid, giving off a most peculiar and pungent odor, most difficult to wash off.

**Measurements:** Coll. No. 2966, Kartabo, June 17, 1924, male, gives, in the flesh, the following measurements: total length 1360 mm., tail 560, jaw 29, head width 10, body width 6, eye diameter 4 mm., rows of scales 17, ventrals 196, subcaudals 184, weight 30 grams.

**Color in Life:** Coll. No. 231, American Museum No. 18179, Kartabo, August 8, 1920, Color Plate 196, total length 1720 mm., weight 24 grams. There is little variation among these snakes so this description may be taken as typical. Top of head sepia. An indefinite streak along side of head which deepens to a narrow band of black just above the upper labials, and continues across the iris in two areas of dark green. The second to fifth upper labials with narrow shading of black along upper edge. A

streak of pale vinaceous buff extends across the top of the preocular, tinging the lower portion of the supra ocular and continuing in a horizontal line a little back of eye, where it deepens to umber. Upper labials pale yellow, shading downward to bluish-white. Throat bluish-white with faint tinge of pink. Body above light ashy, ventral surface dark vinaceous brown. A narrow rim of picric yellow extends around the lower four-fifths of the pupil, widening toward the top and shading to silver white, which extends over all the upper part of the iris. Large irregular patches of parrot green lie on either side of pupil flecked with black. The lower part of iris is silvery white flecked with maize yellow.

**Food:** Some of the hunting of this snake must take place on the ground as shown by certain stomach contents. Here is the food of four individuals: (1) A medium-sized *Ameiva*. (2) Two *Anolis chrysolepis*. (3) Two small treefrogs, one a *Hyla rubra*. (4) *Hyla rubra* and a female manakin.

**Parasites:** A five-foot snake captured on February 24, 1922, had three large ticks fastened tightly to the head, one of which, on the left lower side of the jaw, had worked half-way back from the tip of the mandible, inducing such severe injuries that the entire lower jaw was shrunken and distorted.

**Breeding:** No. 2648, a six-foot female captured on March 17, 1924, contained three fully formed eggs measuring 7 by 17 mm.

### *Oxybelis fulgidus* (Daudin, 1803).

(Plate IX, Fig. 40).

**Names:** Green Whip Snake, Emerald Tree Snake, Parrakeet Snake (Creole). Wah-cooqua-malee, A-di-a-mung, "living with leaves" (Akawai Indian).

**Range:** Mexico and Central America, south to Bolivia and northern Argentina.

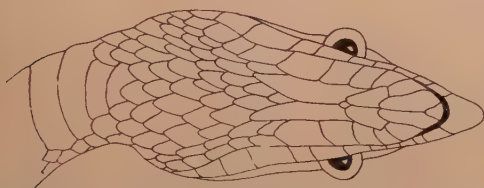
**General Account:** This is a large, slender tree snake, with long, pointed, overhanging snout, dark green above, yellow green below, with a narrow white lateral line. It is about as common at Kartabo as its relative, *Oxybelis a. aeneus*, and has very similar habits. Twice, when disturbed, I saw these snakes puff out the anterior portion of the body, thus bringing into full view the orange and yellow colors usually concealed beneath the scales, and described below.

Seven feet, one inch, was the largest snake captured. In ten specimens, none under four and a half feet in length, the ventrals varied from 200 to 214, the subcaudals from 150 to 162. A 1608 mm. total length specimen weighed 89 grams, and another 2063 mm. over all, weighed 224 grams or one-half pound. In most individuals the sharp tip of the snout overhangs the lower jaw by 4 or 5 mm.



No. 532 was shot as it was creeping slowly along some slender branches toward a male Gold-headed Manakin. I watched it for many minutes as it slowly reached forward with its chin and neck, testing every dead twig with flickering tongue, and laying the trail for the five feet of following body and tail. I only discovered it because a cluster of leaves moved slightly when there was no wind. Twice when I took my eyes away I lost it completely although it had not moved in the interim. The extremely slow forward motion conveyed to my eye below no sense of movement, and the tail was so slender and tapered so gradually that it was difficult to determine whether one saw it or not. The color of the belly was exactly that of sunlit leaves from below. In the preserved specimens the greens have all turned to blue.

As I watched I was suddenly aware that the snake was observing me, although it was directly overhead. My glasses focussed on the ventral view of the head showed the eyes so twisted out and down that more than half of the iris and pupil were clearly visible, directed straight downward each side of the head. The eyeball must have been rotated a full ninety degrees downward. When I remained quiet for a few minutes the eyes disappeared and the snake began its insensible forward motion toward the bird. I shot it when it was almost within striking distance.



TEXT-FIG. 3. *Oxybelis fulgidus*. Head from below showing ventral vision.

**Measurements:** Coll. No. 2854, Kartabo, May 29, 1924, adult male, total length 1610 mm., tail 550, jaw length 42.5, eye diameter 6 mm., ventrals 205, subcaudals 161, weight 136.2 grams.

**Color in Life:** There is very little variation in pattern and color among these snakes, so the following may be considered typical. Coll. No. 523, Kartabo, March 1, 1922, Color Plate 320, total length 1608 mm., tail 530 mm., weight 142.5 grams. Head above dark forest green. Side of face the same with a loral streak of chalcidony yellow. Upper and lower labials, chin and ventrals dominantly yellow green. Body above forest green, while sides of body and upper corners of ventrals are stone green. Lateral line pinkish-white, which, cutting ventrals close to upper border, becomes

deep yellow toward neck. All scales of labials, chin and ventrals edged with pinkish flesh color. Pupil rim golden yellow. Pupil slightly pulled out at upper posterior corner, where the rim pigment widens, becoming yellowish-white, then tawny. A patch of thick golden buff in upper anterior edge of iris, also an irregular crescent of buff to the left of center, below which it widens to the right along the base of iris. Remaining iris is dark brown, flecked in the upper posterior corner with large patches of orange buff, and fewer patches of pale buff toward the front. The skin under many of the scales is apricot orange.

**Dermal Coloring in Life:** Coll. No. 708, Kartabo, August 19, 1922, Color Plate 669, adult female, total length 2063 mm., weight 194 grams. In life, ordinarily, the close fitting, tile-like, overlapping scales of the neck show only the scale color of dark green above and yellow green on the lateral rows. Several times when alarmed, these snakes were seen to distend their neck, cobra-wise, when the green colors of the seventeen rows of scales became subordinated to the broad bands of orange which cover the skin between the scales. In a dead snake, when the skin was stretched laterally, these wide bands were seen to alternate with equally wide bands of pale yellow.

An emerald tree snake with a normal neck width of 16 mm. permits lateral stretching to 70 mm. Except in the case of the several extreme dorsal rows of scales, the lateral relation of scales to intervening expanse of skin is 4 to 8 mm., or twice as much colored skin as scale. These alternating yellow and orange bands are directed obliquely forward from their apex on the vertebral line. They are dominantly dorso-ventral in extent, as horizontally the scales are less capable of separation.

**Food:** Three snakes had eaten the following: (1) Remains of a small lizard, probably *Anolis*. (2) Two medium *Anolis chrysolepis*. (3) Bones of a small bird.

**Breeding:** No. 708, collected August 19th, contained six fully-formed but shell-less eggs, even-ended oblongs, 10.5 by 22.5 mm.

***Oxyrhopus petola petola*** (Linnaeus, 1758).

**Name:** Narrow-banded False Coral Snake.

**Range:** Mexico south to Brazil and Argentina.

**General Account:** This is a small snake, black with many rather narrow, more or less imperfect, transverse rings of white and red. It is semi-fossorial in habits and nocturnal, although the rather vertical pupil is very broad. Only four specimens were taken at Kartabo, two of which were uncovered in the same rice field which had yielded many *Micrurus*, *Hydrops*, *Erythrolamprus*, *Liophis*, etc.



It is a gentle snake, showing no resentment at being handled. One died after a half hour's accidental exposure to the sun.

*Color in Life:* Coll. No. 92, Kartabo, March 26, 1919, total length 260 mm., tail 64 mm., upper labials 8, entering eye fourth and fifth, ventrals 214, subcaudals 90, weight 3.2 grams.

Ground color above shining purplish-black, cut by 45 bands, several of which are broken and do not meet, the others extending clear across. The widest is that on the hinder part of the head. This is creamy white as are the succeeding seven or eight, then a pink tinge becomes apparent and this increases posteriorly, until the bands on the tail are coral red. The ventral scales are white. In preservative after twenty-seven years, this same snake had become pale white, with dorsal bands of light brown. Removed from preservative, and with excess moisture shaken off, the weight is 3.1 grams, as compared with 3.2 grams immediately after death.

Coll. No. 508: Kartabo, March 1, 1922, Color Plate 326, total length 250 mm., tail 65 mm., weight 3 grams. This individual differs from No. 92 chiefly in having almost double the number of dorsal cross bands in a jet black ground color. These are so narrow that they should be called lines instead of bands. On the back of the head behind the gape there is a broad band of scarlet. The next few rings and those of the lower back and upper tail are arranged in a more or less definite succession of a band of scarlet between two narrow creamy white rings, but throughout all the rest of the dorsal surface there is no regularity. Complete and incomplete whitish lines alternate with corresponding scarlet ones, in no regular order. After the anal area of greater regularity, the tail ends in a succession of regular white bands. The labials, chin, throat and the ventrals, back to the sixteenth, are all slate gray, the rest of the under side being creamy white.

***Philodryas viridissimus* (Linnaeus, 1758).**

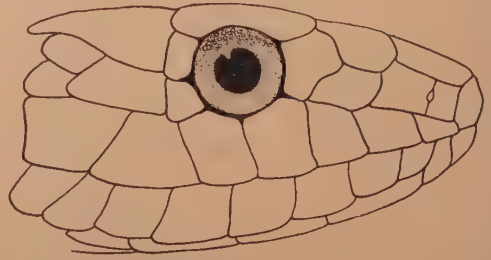
*Name:* Two-colored Green Tree Snake.

*Range:* Guianas, Brazil, Colombia, Ecuador, Peru and Bolivia.

*General Account:* A tree snake of medium size, dark green above, yellow green below, iris brown with gold dots over upper portion. Rare at Kartabo where only two specimens were taken.

*Color in Life:* Coll. No. 3264, Kartabo, June 19, 1920, Color Plate 148, total length 910 mm., tail 230, eye diameter 4, body width 11, body height 15 mm., weight 57 grams. General body color lettuce green above, shading laterally to greenish-yellow on ventral scales. Top of head parrot green, two black spots on scales in front of eye and

three behind, forming a broken facial band. Upper labials emerald green, shading posteriorly to light yellow green. Lower labials, chin and throat pale greenish-gray touched with pale cinnamon pink. Scales back of gape, along lateral neck and forming anterior border of the first fifty ventrals, beryl green, which in spite of its name in Ridgway's Key appears a most delicate blue. This color occurs sporadically on other ventral scales and on all the caudal ventrals.



TEXT-FIG. 4. *Philodryas viridissimus*. Eye in detail.

Pupil round. Iris a tangled mesh of dark cinnamon brown with a sparse but conspicuous flecking of gold dots across the upper portion. Inside of mouth pallid blue violet, tongue blue green, tipped with violet and black. Caught at dusk, draped quietly over foliage.

Coll. No. 3557: Kartabo, July 1, 1924, male breeding, total length 1195 mm., tail 315, jaw length 28, eye diameter 4, body width 14, body height 19 mm., rows of scales 19, ventrals 217, subcaudals 121. Caught in low bush while it was being mobbed by three hummingbirds.

***Pseudoboa coronata* Schneider, 1801.**

*Name:* Black-headed Scarlet Snake.

*Range:* Venezuela, Guianas and Brazil.

*General Account:* Only two specimens, the larger twenty inches in length, were taken at Kartabo. The first, No. 507, caught on the ground near the laboratory, was described, painted, and then made its escape the same night, and was never seen again. Two weeks later, on March 15, 1922, a second specimen, No. 3287, identical in coloring and 455 mm. in length, was found in the same rice field as all the other real and false coral snakes, a half-digested eel in its stomach. At Caripito only a single specimen was taken.

*Measurements and Color in Life:* Coll. No. 507, Kartabo, March 2, 1922, Color Plate 324, total length 485 mm., tail 105, head length 9, head width 7, eye diameter 1.5, body width 7, body height 8 mm., rows of scales 17, upper labials 7, ventrals 174, subcaudals 89, weight 10.5 grams.



Dorsal head scales and band on neck black. Sides of face and lower labials dull gray, shaded with darker. Band of yellowish-white at back of head with two pink lateral patches. This band widens on sides of head and joins the general whitish tone of the chin and throat. Body above coral red, each scale tipped slightly with dark gray. Ventrals yellowish-white, tail grayish. Iris dark.

This species seems equally rare at Caripito where a single one was collected as it was making its way slowly across a trail. Coll. No. 30,112: Caripito, May 21, 1942, total length 296 mm., tail 70 mm. Its color was exactly like that of No. 507 except for an irregular series of very faint dusky, short, cross lines at intervals down the back. The pupil was very slightly vertically oval.

***Pseudoboa newwiedii***

(Dumeril and Bibron, 1854).

**Name:** Brown and Yellow Snake.

**Range:** Guianas, Trinidad, Venezuela, Colombia, Panama and Costa Rica.

**General Account:** Two specimens only from Caripito, not found at Kartabo. Both were taken on the ground and put up a lusty fight when seized. Both were identical in coloring, light sepia or seal brown above with the head definitely darker, almost black. Below yellowish-orange. Coll. No. 30,135: Caripito, June 13, 1942, total length 906 mm., tail 196 mm., weight 151 grams. No. 30,162: Caripito, July 2, 1942, total length 793 mm., tail 222 mm.

***Pseustes poecilonotus polylepis* (Peters, 1867).**

(Plate X, Figs. 41, 42 and 43).

**Names:** Liana Snake, Bird-eating Snake.

**Range:** Venezuela, the Guianas and Brazil.

**General Account:** I know of no Creole or Indian name for this well-known snake, and the variety of pattern and coloring defy usual adjectives. In the field we called it the Liana Snake owing to its astonishing imitation of a monkey ladder, and the Bird-eater on account of the dominant nature of its food. At Kartabo we found it common and at least two dozen specimens were encountered in the quarter square mile of jungle. These varied from seventeen inches to five feet, while at Caripito the only specimen obtained measured a full six feet.

The majority of the snakes were seen or taken on the ground, but three times I saw them in trees. A male in full breeding condition was captured as it was swimming the Mazaruni River where the stream was almost a mile in width. The adult snakes from 1100 mm. (about three and a half feet) upward are monochrome above and below in two phases, one a deep olive green with lemon yellow lower head, chin and throat, and the other a rich red brown with yellowish-orange anterior lower parts. In the

young, at least from 446 mm., the variation is still more extreme, the basic colors being red brown, or gray or olive above, banded with darker shades of the ground color, with face and throat black-marked white or green-marked yellow. The iris is the most stable character and almost always offers a reliable, superficial means of field identification. In general the iris is mottled silvery, with dark pigmented areas fore and aft, which are crossed with about three, distinct, white, vein-like lines, radiating from a narrow area on the anterior and posterior equator of the pupil, extending out to the external rim of the iris.

Individuals differ from one another as much in their emotional display as in their pattern and pigmentation. No. 336, definitely a young snake, was very strong in its constricting ability, but in spite of much handling made no attempt to bite. Nos. 2667 and 2727, approaching adult size and patterning, were extremely vicious, striking repeatedly and vibrating their tails with great vigor.

One outstanding habit which, in my experience is confined to this and to a congeneric species, is that of contorting the entire body and tail into a series of rigid undulations. In a four foot snake there was about twenty of these successive half curves on each side of the body. When lying on the ground in this condition the snake's resemblance to a short extent of the common monkey ladder is startling. Three times on the ground, twice among branches, I have seen this effect. For example on March 23, 1922, I wrote, "I caught a three foot Liana Snake (No. 521) wholly reddish-brown, at the entrance of Puruni Trail. It lay across the trail rigid as an iron rod, with every inch regularly bent and waved, as if a section of liana had recently fallen. Snakes of all species look much like this when they have been killed with chloroform. This individual never moved even when my hand approached within an inch of his head. Not until I pressed down on his neck and gripped him, did he 'break trance' and coil around me like a flash. From this moment on he fought all the way home.

**Measurements and Color in Life:** Coll. No. 334, Kartabo, October 2, 1920, Color Plate 229, fig. a, a young male, total length 446 mm., tail 125, eye diameter 4 mm., ventrals 198, subcaudals 131, weight 7.5 grams. A specimen in the yellow brown phase, with typical eye pattern, but somewhat browner. Pinkish-buff above shading to tawny olive toward head and tail. Lace-like pattern on head and face markings dark snuff brown. About 42 irregular, broken bands on dorsal orange cinnamon, becoming grayer and indefinite toward tail. These bands are stippled along their edges with umber. Sides of body



stippled with hair brown and deep orange. Ventrals white, mottled heavily with fuscous, which becomes an almost solid color toward tail. Upper edges of ventrals with 40 patches of chestnut brown, each of which covers three ventral scales.

Coll. No. 78a: Kartabo, September 10, 1919, total length 609 mm., weight 16 grams. General color light grayish-olive, with broad, irregular bands of dark grayish-olive. Beneath, ivory white anteriorly, becoming more and more suffused with olive until it is concolorous with the back. Pupil a longitudinal, very broad, oval. Iris dull yellow buff, with a suffusion of dark brown in front and back, reaching the pupil. A few transverse white lines across these dark areas.

Coll. No. 251: Kartabo, August 23, 1920, Color Plate 229, figs. b and c, total length 615 mm., tail 176, eye diameter 5.5 mm., ventrals 191, subcaudals 125, weight 18.4 grams. General color above light grayish-olive with broken irregular mottling of fuscous and hair brown on head. Three short, black bands project down over the white upper labials, the central one extending straight down from the eye and covering a lower labial. A faint dark stripe of mottling extends along side of face. The body shows 40 wide, diagonal, rather irregular, transverse bands of deep grayish-olive, sometimes narrowly split in two. The anterior scales of these bands are touched with black. The throat is white with black marks. Ventral surface white on neck, becoming more and more thickly stippled with dark brown which coalesces near the tail. The lower parts are also flecked with hair brown. Pupil slightly ovate horizontally. Iris pinkish-buff, finely stippled with white. Three spots of snuff brown in front, behind and below, and three irregular white lines radiating toward pupil from anterior and posterior outer rims.

Coll. No. 2727: Kartabo, March 29, 1924, total length 953 mm., tail 260 mm., ventrals 200, subcaudals 126, weight 75.5 grams. A specimen with distinct dorsal markings and with the typical white streaks in the iris but fainter than usual. Head above grayish-olive with symmetrical lighter and darker markings, and a dark streak running diagonally across eighth labial to eye. Upper labials amber yellow with patches of lime green. Lower labials pinkish-white with a large patch of lime green below eye, and a speckled area of the same color around snout. Large lateral patch of orange scales just back of and below point of jaw. Ventrals and scales of three lower rows, for about four inches from head, edged anteriorly with apricot yellow.

General body color violet brown with fine speckling of green, shading to clouded hazel on mid-body, and russet on tail. More than

half of the entire length has eighteen irregular, dorsal, faintly crescentic markings, composed toward the head, of red-edged, dark-mottled, green scales with a few scattered brown spots, backed with coral pink skin. The remaining markings on the rest of the body are extremely faint and on their way toward obliteration. Ventrals pale mottled buff toward head, shading backward to fawn color. Iris light pinkish-cinnamon, with brilliant white pupil rim, broken before and behind. Dark patches of sepia at each side of pupil, and white radiating veining.

Coll. No. 521: Kartabo, March 22, 1922, Color Plate 349, total length 1565 mm., tail 355, eye diameter 6.2 mm., weight 136 grams. This snake is almost solid red brown above. In detail head above walnut brown, with shadings of burnt umber on orbits. Snout vinaceous tawny, upper sides of head brownish-olive, paling laterally where the color passes through eye. Below this line the upper labials are light cadmium touched with orange. The scales around nostril and snout are vinaceous tawny. Body above red brown, becoming more thickly flecked with terra cotta toward ventrals. The part of the ventrals which extend up the sides are of this same terra cotta. Lower labials, chin and under neck are buffy yellow touched with darker yellow and reddish toward snout, with a few whitish streaks under the neck which merge backward with large mottlings of pale rose, into the main ventral color of dark orange red. Toward the tail the ventrals acquire a bloom of pale violet gray. Pupil rim broken at both sides, of brilliant ivory. Iris light buff, with sparse black stippings above, which are denser below. Two solid patches at each side of iris dark brown, fraying out at edges and shot with a few silvery white veins.

Coll. No. 336: Kartabo, October 2, 1920, Color Plate 245, total length 1310 mm., weight 111 grams. Solid dark olive green above. Wax yellow on labials, chin and throat, becoming mottled posteriorly with olive green on a few anterior ventrals, until the whole is concolorous. Iris, lower three-fourths buffy-brown, upper fourth sandy, with fine white stippling. Strong pupil rim of clear buff, two or three radiating lines silvery white, from anterior and posterior outer iris edge almost to pupil. After twenty-six years in preservative the whole snake is vinaceous brown.

Coll. No. 30,175: Caripito, July 15, 1942, female breeding, total length 1806 mm., tail 463 mm., weight 490 grams. Plain olive green above, below bright chrome yellow on chin, throat and jaw scales upper and lower. From here back, the bright color dulls within a few inches to the general color of the ventral surface, olive buff. Iris dark hazel



brown with silvery veins as usual, silvery white above and below.

In full grown monochrome snakes, long after the dorsal, transverse bands of the juvenile pattern have disappeared from the scales, these bands reappear in strong outline when the skin is stretched. On the skin between the scales they are etched throughout life, although under no stress of danger or excitement have I ever seen this species distend its neck as other serpents do.

*Food:* No. 2665 had swallowed two eggs of a seedeater, with sufficient shell for at least this identification. In the stomachs of three other snakes were the bones of small birds, and in one the bones of a small hawk, probably the Bat Falcon (*Falco ruficularis*).

*Breeding:* No. 30,175, Caripito, July 15, 1942, total length 1806 mm., was a female weighing 490 grams. There were eleven eggs in the oviduct, shell-less oblong yolks, each 15 by 45 mm.

*Pseustes sulphureus sulphureus*

(Wagler, 1824).

(Plate X, Figs. 44 and 45).

*Names:* Puffing Snake, Black-tailed Golden Snake. Yellow-belly (Creole). Sal-la-bu (Akawai Indian).

*Range:* Guianas, Trinidad, Venezuela, Peru, Ecuador and equatorial Brazil.

*General Account:* This large powerful constrictor was as common at Kartabo as its congener, *P. poecilonotus polylepis*, and its pattern and color variation were even more confusing. While the dorsal coloring may be monochrome, olive, brown or yellow, this is not an adult pattern but may occur in an individual only one-third grown. The usual pattern shows a series of conspicuous dorsal cross markings, crescents or bands, single or double, or even more intricate figures. The general tendency is a gradual change from yellow background with black markings on the head and anterior body, to black with corresponding yellow markings posteriorly. A nine-foot snake taken at Caripito was larger than any captured at Kartabo. This snake in pattern was curiously like a very large *Drymarchon c. corais* but with completely reversed color pattern. Concealed dermal markings are very characteristic and correlated with an optical defense mechanism. Also the rigid, liana-like habits are as strongly developed as in the preceding *P. polylepis*. Both of these habits were exhibited in an individual Yellow-belly which I caught on May 10, 1924, near the laboratory at Kartabo. My journal note reads as follows:

"May 10, 1924. Worked among the branches of a giant fallen jungle tree near the Cuyuni River for three hours, and later while running home before a threatened

heavy rain, I leaped over a bit of monkey ladder lying directly on the trail. After I had gone on some distance I seemed to remember a curious regularity about the stick and went back. It was a splendid *Phrynonax sulphureus* (No. 2857) lying flat, stiff and straight but strongly and evenly waved. The snake moved only a fraction of an inch as I slowly brought the gun barrel across its neck, but then it struck viciously and threw its coils tightly about the gun and my leg. I was loaded down with birds and an aguti and could not free the coils, and so limped home. In a vivarium the snake gave a magnificent exhibition of puffing, the entire anterior third swelling up as if filled with two or three hen's eggs. As the skin of the throat and anterior body rose, swelled and expanded, the inter-scale golden skin color leaped into view, merging with the scales themselves. On each side of the posterior throat conspicuous streaks of purplish-black appeared. It presented a truly fearsome sight, and simultaneously the tail quivered and rattled noisily against whatever object was within reach." (Plate X, Figs. 44 and 45).

With all the bewildering array of pattern and color variations, it is especially valuable in the field to find one character of satisfactory reliability, which delineates this species: The iris has a remarkably consistent pattern, the background brownish-black, with a fine mist of paler brown lines radiating outward from the bright silvery pupil ring to the outermost borders of the visible eyeball. It thus differs radically from the iris of the congeneric species, *Pseustes polylepis*.

*Measurements and Color in Life* (in order of size): Coll. No. 15, Kartabo, June 15, 1919, total length 890 mm., weight 56.2 grams. A dull, olive brown snake with faint oblique markings on anterior two-thirds of back dull yellow. This color occurs between the scales so that when they are completely in place the snake is uniformly olive brown. Beneath pale lemon yellow, gradually becoming smoky brown on the posterior third, both above and below. Iris clove brown, with a regular dense mesh of olive brown, and a narrow bright gold pupil ring.

Coll. No. 2691: Kartabo, April 9, 1924, skin preserved, Color Plates 690, 691 and 692. Head isabella color, shaded with olive and black. General body color olive brown shading to tawny on posterior third, and gray on tail. Thirty-six arrow-shaped, forward pointing black-edged dorsal markings which become broken toward ventrals. These are buffy brown shading to dark wine color posteriorly and very dark gray on under surface of tail. The dorsal markings are narrow on the anterior body, leaving large interspaces with a faint stripe between. The interspaces became narrow toward tail



where they exist as faint rings. As the dorsal markings become larger they acquire a light central streak and the stripe between them becomes stronger. Scales of the body color, especially on the dorsal area, have partially concealed edges of apricot yellow, posteriorly becoming more orange. Scales in the center of the mid-body dorsal markings have white edges. The anterior lateral scales have lemon yellow edges which make the body appear to shade into the citron yellow of the forward ventrals, which become mottled on mid-body with dull brown. They turn vinaceous gray and then almost black on tail.

There is a dark streak backward from the eye extending the length of the head along the side of the neck, becoming broader and broken laterally. The scales in the center of this have white edges. The skin under this marking is velvet black, as also are several large scale spots under the chin. Labials, chin and neck bright yellow, the five posterior upper labials and four lower just under the eye with black rear edges. The eye and iris are typical of the species.

Coll. No. 2733: Kartabo, April 16, 1924, skin preserved, total length 812 mm., tail 201, jaw length 27, eye diameter 5.5, body width 12, body height 16 mm., rows of scales 21, ventrals 224, subcaudals 142, weight 39.5 grams. This specimen is duller in every way than No. 2691. The black under-neck skin marks are very faint, occurring as a broken line instead of forming large blotches as in other individuals.

Coll. No. 238: Kartabo, August 27, 1920, Color Plate 213, total length 1342 mm., tail 242, eye diameter 6 mm., ventrals 219, subcaudals 144, weight 93.5 grams. Head above is buffy olive green, back the same, shading on posterior third to brownish-olive. Tail wholly black. Anterior half of body indistinctly banded with dusky, posterior half with 12 or 13 bands of hazel. Upper labials and ventral head empire yellow, shading posteriorly through olive yellow to light brownish-olive, and to purplish-black on tail.

Coll. No. 2857: Kartabo, male, May 10, 1924, total length 2060 mm., tail 550, eye diameter 9, body width 26, body height 41 mm., ventrals 222, subcaudals 135, weight 679 grams (1.5 pounds). This snake was very fierce when first caged and puffed out all along the body for a distance of at least twenty inches, the largest swelling being near the neck, a full three inches from side to side. The head seemed small and shrunken in its sunken position in the large bulging mass.

Coll. No. 30,281: Caripito, July 1, 1942, total length 2752 mm. (nine feet), tail 756 mm., ventrals 221, subcaudals 143, weight 1472 grams (3.25 pounds). Above pale olive green, head plain with a narrow black line

from the eyes back to three-fourths length of head behind. A series of dorsal V-shaped, black marks; narrow arms leading obliquely back from the apex. These marks become thicker as to arms and closer together, until at mid-body they merge and the pattern becomes solid black with well separated, double, vertical bands of sulphur yellow. These die out after four or five faint double lines on the tail. All of the remaining tail is jet black. Below, pale sulphur yellow, with a lateral series of freckled black spots, beginning at three feet from the head. These become more numerous, forming a checker-board pattern with the sulphur yellow. About five feet back of the head, the black becomes dominant on the belly, leaving a lateral series of bright yellow spots which die out at the vent. Iris hazel with the usual outwardly directed series of fine dark brown lines.

*Food:* Consisting wholly of birds. (1) A domestic chicken and the feathers of some small bird. (2) Bones of birds. (3) Caught while being mobbed by a pair of kiskadees, with the head of the snake almost at the nest which contained three nestlings, twenty-five feet above the ground.

#### *Siphophis cervinus cervinus*

(Laurenti, 1768).

*Name:* Yellow Frog Snake (Creole).

*Range:* Guianas, Trinidad and Brazil.

*General Account:* In 1916 and in 1920 I took three specimens of this snake, sent them north alive to the New York Zoological Park, where they were named by Dr. G. K. Noble. No. 182a was taken on December 20, 1920, and was 810 mm. over all. I find no further data.

#### *Spilotes pullatus pullatus* (Linnaeus, 1758).

(Plate X, Fig. 46).

*Name:* Tiger Snake.

*Range:* Mexico south to northern Brazil and Argentina.

*General Account:* Three specimens were caught at Kartabo in 1919, and two others at Guanoco, Venezuela, in 1922. All were sent alive to the New York Zoological Park. A sixth snake found half-devoured by vultures had the remains of a bird in its stomach. All these Tiger Snakes were brilliantly colored with contrasting black and yellow, and none were under five feet in length. No other notes were made.

#### *Tantilla longifrontale* (Boulenger, 1896).

*Name:* Black-headed Snake.

*Range:* Venezuela and Colombia.

*General Account:* This species was not found at Kartabo. The only specimen from Caripito was taken from the stomach of an *Erythrolamprus aesculapii*, which was 410



mm. in total length. The latter snake was uncovered in a patch of sand and leaves inside high jungle.

This little black-headed snake was quite perfect anteriorly, but having been swallowed tail first, the posterior part of its body and its tail were half-digested. It is Coll. No. 30,145 and was taken with its devourer on June 18, 1942, and measures approximately 124 mm. over all.

The entire top of the head and nape is black except for a pale band across the nostrils and two large patches, side by side, on the nape. Laterally on the head, there is much less black around the eyes than in *T. melanocephala*, and considerably more white pigment back of the gape.

***Tantilla melanocephala* (Linnaeus, 1758).**

(Plate X, Fig. 47).

**Name:** Pink-headed Snake.

**Range:** Central and South America south to Argentina.

**General Account:** A small dark brown snake, the head about the same size as the body, with no appreciable neck, tapering gradually to tail. Head darker, body lighter brown, snout, chin, throat, two nuchal bands and sides of body pinkish. Ventrals pale green.

Six specimens were taken at Kartabo but none at Caripito. Several of these were sent north alive, but on two, some detailed notes were made. All were found on the surface of the jungle floor except one which was burrowing. They were gentle snakes, almost never striking, and were delicate as well as timid, and did not survive long in captivity.

**Measurements and Color in Life:** Coll. No. 236, Kartabo, Color Plate 205, August 19, 1920, total length 328 mm., tail 66, head length 7.5, eye diameter 1.5, body width 5.5, body height 4.5 mm., rows of scales 15, ventrals 144, subcaudals 61, weight 3.3 grams. Head bone brown, snout dark russet brown and two narrow cross bands back of head pink. Back russet with three lateral lines of pink, separated by a broader upper and a narrower line of mottled black. Sides of head buffy pink. The brown of the head extends downward in three rather regular curves, one enclosing the eye, a second touching the gape and a third on the lateral scales of the neck, immediately in front of the lateral lines. Eye, pupil very large and round. Iris narrow and brilliant scarlet, rather dusky antero-posteriorly.

Coll. No. 325: Kartabo, September 12, 1920, total length 296 mm., tail 60 mm., weight 2.2 grams.

**Food:** Two specimens had eaten small insects, including two wood roaches.

***Trypanurgos compressus* (Daudin, 1803).**

(Plate X, Fig. 48).

**Name:** Red-headed Water Snake.

**Range:** Guianas, Trinidad, Venezuela, Colombia, Bolivia and Brazil.

**General Account:** Two specimens were taken at Kartabo, one of which is No. 18,151 in the American Museum of Natural History. Not seen at Caripito. This is a slender, oval-headed snake, head and iris pink, a narrow pale yellow nuchal band, then an inch of black. The rest of the snake is red with about 45 black bands or alternate spots one-third as wide as the interspaces. Whitish below.

One of the snakes was taken near the river, the second, No. 3267, November 20, 1920, total length 570 mm., became tangled and drowned on the submerged rope hawser of our motor boat, tied up at the Kartabo laboratory wharf. It must have become entangled in attempting to climb up from the water.

**Measurements and Color in Life:** Coll. No. 200, Kartabo, Color Plate 122, June 6, 1920, total length 450 mm., tail 105, eye diameter 2.3 mm., weight 6.5 grams. Head dark carnelian red, iris the same, pupil broadly vertically elliptical. Posterior head dull sulphur yellow. Body brownish-red with black markings. Below pinkish-white. Width of yellow collar 3.5 mm., black zone 16 mm. Forty-seven irregular markings of black along back and sides, extending from the black collar to the 15 mm. of tail tip, which are black. Of these markings 13 are complete bands, the rest being two rounded spots, alternating with each other. The relative widths are, black bands 3 mm., red spaces 8 mm.

***Xenodon colubrinus* (Günther, 1858).**

(Plate XI, Fig. 49).

**Name:** False Fer-de-lance, Frog-eating Snake. False Labaria (Creole).

**Range:** Central America, Colombia, Peru, Bolivia, Brazil and British Guiana.

**General Account:** A heavy, thickset snake with very short tail. Adult usually mottled reddish-brown or grayish-black above with many indistinct cross bands of gray. Face and snout black, below mottled pale buff. Pupil round with scarlet ring, iris dark mottled. The young have twelve or more five-banded dorsal figures of gray and black on red brown background; white and mottled below. This terrestrial species was found occasionally at Kartabo, but not seen at Caripito. It occurred in marshy localities or wet jungle. No. 253 was caught when swimming a half-mile-wide river. The young are remarkably like fer-de-lance in pattern, color and movements, especially striking posture.



*Measurements and Color in Life:* Coll. No. 652, Kartabo, April 29, 1922, young male, total length 445 mm., tail 60, head length 14, body width 12.5, body height 11 mm., ventrals 153, subcaudals 45, weight 33.5 grams. This young snake closely resembles a fer-de-lance except for the lack of a lemon yellow tail. The dorsal series of black and gray V-bands have the apices touching each other on the mid-dorsal line, unlike the condition in No. 240.

Coll. No. 240; Kartabo, Color Plate 212, August 20, 1920, total length 450 mm., tail 65, eye diameter 4.8 mm., ventrals 148, subcaudals 49, weight 26.3 grams. Head mottled with varying shades of pinkish-brown, pale on sides with brown blotches. There is a fairly distinct black line or band from snout above the nostrils back to eye, and from posterior eye to gape. The markings of the back are in the form of successive angled bands. The sequence of these, proceeding posteriorly, is as follows: a wide, red brown interspace, V-shaped gray band and black band pointing posteriorly, a narrow red brown band or interspace, V-shaped black band and gray band pointing anteriorly, another wide red brown interspace, etc. There are 12 of these five-banded figures distributed along the body, giving place on the tail to faint, indefinite gray and black markings.

The chin and throat are immaculate white. Sides of body whitish, interrupted with large spots of brownish-black. These have a regular relation to the dorsal markings, there being one for each of the wide interspaces, and one for each of the four boundary bands of the narrow brown interspace. The mid-portion of the ventrals is mottled buff and olive brown, beautifully iridescent in strong contrast to the upper dull brown and gray surface. The eye is silvery with this color almost obliterated by a tangle of red brown threads radiating more or less regularly outward in all directions from the pupil. The ring around the latter is lemon yellow.

Coll. No. 735: Kartabo, male, August 29, 1922, total length 610 mm., tail 91, eye diameter 15.5 mm., ventrals 146, subcaudals 54, weight 36.5 grams.

Coll. No. 253: Kartabo, Color Plate 174, July 20, 1920, American Museum No. 18173, total length 970 mm., tail 125, head length 23, eye diameter 7 mm., weight 152.4 grams. Back reddish-brown with about 35 faint, irregular cross bands surrounded by brownish-black. Scales flecked with olive buff and mottlings of warm red brown, becoming redder near ventrals. Top of head brown, flecked with buff, the flecks increasing and merging to form a pale temporal band. Snout, face and ventral surface of head black, with scattered irregular spots of pink-

ish-buff. Ventrals buffy pink mottled with rose and brownish-olive. Iris dark brown finely flecked with gold, pupil round, with a bright red outer ring.

*Food:* (1) Large *Bufo marinus*. (2) A 55 mm. *Bufo typhonius*. (3) 3 *Microhyla microps*. (4) 27 tadpoles and half-tailed young frogs. (5) 1 young *Bufo guttatus*.

*Xenodon severus* (Linnaeus, 1758).

(Plate XI, Figs. 50 and 51).

*Names:* Frog Snake. Crapeau or Mattopi Snake (Creole).

*Range:* The Guianas, Venezuela, Colombia, Ecuador, Peru and Brazil.

*General Account:* A very poisonous-looking snake, with flat head, expansive neck, thick body and short, stubby tail. It is, however, a rapid mover. It was fairly common at Kartabo but not taken at Caripito.

The variety of pattern and coloring is almost indescribable. The adult snake tends to be monochrome, green, brown, black or rufous, and yellowish or gray below. But dorsal bands or spots may persist in large specimens, black-edged scales or more definite bands. The young usually have a complex angular pattern of bands and hour-glass figures. One fairly consistent mark is a large central nuchal patch of pink, red, orange or rufous, surrounded by one or more concentric bands of the same color. This becomes very conspicuous when the snake flattens its neck, cobra-like. When dozens of detailed kodachrome photographs are available of individuals carefully measured and sexed, some semblance of order may emerge from the infinite variety of pattern and pigmentation. I present seven descriptions.

Most of these snakes were taken in bamboo clumps or when they were crawling across trails or over the jungle floor. Their pattern made them almost invisible when not in motion. No. 77 when frightened took to the water at once and swam to a floating bush. No. 65 was caught when swimming far from land, well out in the river. It swam very high, compressing the body as the boat approached and thus bringing all the concealed markings into view. It tried to climb aboard and when netted flattened its head and struck repeatedly. The markings were so much like those of a fer-de-lance that for a time we did not dare handle it.

No. 510 was one of the most nervous and irascible snakes I have ever seen, striking at the least annoyance, and spreading its neck to an astonishing width and flatness. This was done apparently by means of the ribs, and the conscious object was always to keep the flattened side toward the object of rage or fear, exactly as a male golden pheasant orients its ruff and body plumage broadside to the hen. At times, as I walked around the displaying snake, it would slowly



revolve its expanded neck, and even fold up one side to keep it broadways toward me. Attempts to take motion pictures were very difficult as the snake tired almost at once and after several short displays attempted only to escape.

*Measurements and Color in Life:* Coll. No. 344, Kartabo, Color Plate 256, October 12, 1920, half-grown male, total length 342 mm., tail 38, head length 15, eye diameter 5, body width 16, body height 10 mm., rows of scales 21, ventrals 139, subcaudals 34, weight 22.8 grams. This young snake differs in pattern from most adults. General color above dark brown, lighter on sides. There are twelve backward-pointing, broad, transverse-angled bands of pale wood brown, edged with darker, diminishing in width toward the tail, and breaking up into small, dark patches along the sides. The first of these bands lengthens out into an irregular head marking, back of the eyes. General color of head hair brown, with narrow transverse bands of gray across top of snout and between eyes, also a broad black velvety stripe backward from eye. Upper labials and sides of neck pale brownish-pink. Lower labials and chin creamy white. Ventral surface gray, with quite regular square pink patches along sides, which merge above abruptly with the wood brown of the sides. Iris, upper fifth pinkish-buff, the rest brown stippled with black. A narrow pupil ring of buff.

Coll. No. 2734: Kartabo, April 22, 1924, preserved skin, total length 485 mm., tail 50, jaw length 29, eye diameter 5.5, body width 19, body height 14 mm., ventrals 139, subcaudals 41, weight 24.5 grams. Dark brown with eight very wide pale brown, slightly angled bands. Ventrals dark gray edged with yellow. A large central nuchal area, and a broad anterior, triangular crescent pink, visible in the stretched skin.

Coll. No. 510: Kartabo, Color Plate 322, March 2, 1922, total length 640 mm. Above dark ferrugineous brown, becoming more red laterally, and changing beneath to pale reddish-ochre. Under surface of head orange buff. The background of the iris is tawny brown, except for lower right hand quarter, which is light buff, quite reddish at the bottom. The whole iris is finely stippled with dark brown; the narrow pupil rim is cinnamon.

Coll. No. 65: Kartabo, September 11, 1919, total length 711 mm., weight 80.5 grams. General color above dark ochraceous brown, with 12 to 15 angular, irregular, darker areas occupying the entire width of the dorsal surface and dying out toward the tail. Each dark area is bordered anteriorly and posteriorly with an irregular connected series of large spots of brownish-black. Beneath pale cream color, suffused with pale brown, becoming gray mixed with red on

tail, and yellowish beneath the head. Sides of body with equally spaced dark reddish-brown spots, confluent with the darker color of the sides and of upper surface. Posteriorly these spots are connected with much broken bands of the same color. General color of head cinnamon brown. Labials, loreals, nasals and rostral yellow green, irregularly spotted with fine brown spots, confluent along the joinings of labial scales. A narrow line of the green from nostrils through the eye to angle of jaw. Another line just above this from center of eye light olive brown, fading posteriorly into general body color. A dark brown spot on prefrontals, extending to the anterior portion of frontal.

Coll. No. 608: Kartabo, Color Plate 333, fig. a, March 10, 1922, total length 810 mm. Head above olive green, sides paler. Neck when distended and flattened with a central solid patch of bright grenadine pink, surrounded at a distance by a larger, diamond-shaped band of the same color. This in turn is framed in a large patch of dark olive green. The extreme edges of the flattened nuchal hood are bright lemon yellow. Body generally deep olive green, with indistinct cross bands and diagonal markings of every conceivable kind, olive brown becoming darker toward the short tail. Lower labials and chin olive buff. Ventrals olive buff with irregular cross bands of light gray. Iris buffy brown with dark stippling toward the outer edge.

Coll. No. 3132: Kartabo, June 6, 1920, total length 1031 mm., fully adult snake. General color dark reddish-pink, shading to rich rufous on the tail, where there are large blotches of black.

Coll. No. 3133: Kartabo, October 2, 1920, total length 1503 mm., above blue black, with numerous, irregularly scattered scales of grass green. Ventral surface grass green.

Coll. No. 77: Kartabo, June 3, 1919, total length 1530 mm. (5 feet, 2 inches), body width 50 mm., weight 1245 grams (2¾ pounds). The largest of this species taken. Above dark olive buff, under surface straw yellow. Iris buckthorn brown.

*Food:* (1) Caught near laboratory attacking a small domestic chicken, while it had just swallowed a small marine toad. (2) Just caught a marine toad, 130 mm. long, still alive. Partly digested was a large frog buried in a mass of round worms. (3) 1 grasshopper, 1 *Atta* soldier, 2 large black ants, 1 small spider, 2 leaves. (4) 2 large *Leptodactylus* frogs, 1 *Ameiva*. (5) Small *Ameiva*.

#### FAMILY ELAPIDAE.

Coral snakes, while claiming close kin with forms such as the common and king cobras and kraits, are far less dangerous

because of their small size and relatively short fangs. Most are characterized by brilliancy of coloring such as many successive bands of red, black and yellow. They are closely mimicked by several unrelated, harmless snakes.

They are burrowers and usually nocturnal, and feed on small lizards, frogs and insects. In the localities under consideration I found only two species although locally these snakes were almost abundant.

*Micrurus lemniscatus* (Linnaeus, 1758).

(Plate XI, Figs. 52 and 53).

**Names:** Tricolored Coral Snake. Hot Bead Snake (Creole). Koo-mung, "one who lives in the ground" (Akawai Indian).

**Range:** Northern and central South America.

**General Account:** Locally abundant at Kartabo, but in general, both there and at Caripito found only occasionally. About 35 were collected in all. Those snakes not actually dug up were found as they crawled through the jungle, usually on over-cast days.

The typical color pattern of the common Kartabo coral snake is a black snout, white loreal band and a broad scarlet complete band on the back of the head and nape. These are followed by the first of 14 to 17 body and tail pattern sequences, a large black area trisected by two narrow bands of white, followed in turn by a second scarlet interspace. The scarlet occasionally has the scales tipped with black, producing a dulling of the color, or very rarely there is a tinge of yellow on the white bands, but in no coral snake from British Guiana did I see true yellow bands. Considerable variation occurs in the pattern of the extreme head and tail, but it is always a regular carrying out and continuation of the somatic pattern sequence.

Measurements of three coral snakes of varying lengths are as follows: Coll. No. 825, total length 245 mm.; No. 236a, length 630; and No. 3552, length 900 mm. Tail respectively 20.7, 55 and 80 mm., ventrals 228, 254 and 226, subcaudals 34, 36 and 33, weights 3, 19.8 and 75 grams.

**Color in Life:** Among the 17 snakes taken from a single field there were only two noticeable variations. In one individual all the white bands were themselves bisected or split with narrow lines of black.

Coll. No. 230; March 27, 1919, total length 555 mm. Very aberrant in pattern, for while the white bands are very wide and conspicuous ventrally, they are almost absent on the back. The exact opposite is true of the red bands which are deep in color, with considerable black edging to the scales, and yet below there is hardly a trace of this color. Hence this individual is black above

with strong red bands at wide intervals. Beneath it is black with twice as many broad white bands.

Coll. No. 3552: male, 900 mm. total length, June 30, 1924. This snake showed only ten sets of patterns on both body and tail, all the bands red, black and white being of unusual width and the white very heavily edged with black. Twenty-two years later in the dried, well-preserved skin all the whites are changed to bright yellow, the scarlet and black being unaltered.

Of the 35 specimens taken at Kartabo, 17 were captured in a single marshy field of some three acres extent, all within eleven days, from March 20 to April 1, 1919. Others were taken in the same field on May 20 of the same year. They were all uncovered while the field was being hoed. In total length the first 17 coral snakes measured from 241 mm. (9.5 inches), to 787.4 mm. (31 inches), the average being 577 mm. (22.5 inches). I also counted the scarlet bands on these snakes, including that on the head and that near the tip of the tail. Of two snakes with 14 red bands the average length was 591 mm. (23.25 inches). Seven with 15 bands averaged 628 mm. (24.7 inches), 3 with 16 bands averaged 530 mm. (20.8 inches), and 4 specimens with 17 red bands showed an average length of 534 mm. (21 inches). So age has nothing to do with the number of pattern series.

We found coral snakes much more violent and aggressive than we had been led to expect. When captured they twisted and fought and struck, until allowed to bury themselves in débris in vivariums. The tail seemed to have the ability to flatten itself slightly and when excited was often held upright and twisted about in its own orbit.

*Micrurus psyches* (Daudin, 1803).

(Plate XII, Figs. 54 and 55).

**Name:** Bicolored Coral Snake.

**Range:** Guianas and northeastern Venezuela.

**General Account:** This snake is found occasionally both at Kartabo and Caripito. About a dozen specimens were taken at the former place, none of which were associated with the concentrations of *Micrurus lemniscatus*. Without exception this species seemed more quiet and less aggressive than the congeneric form, almost never making any resistance at capture.

As will be seen from the various descriptions, the pattern shows considerable variation, the two most common phases being black above, with many pale yellow, narrow rings, or alternate broad bands of dark red and black throughout body and tail.

**Measurements and Color in Life:** Coll. No. 633, Kartabo, July 10, 1922, total length 250 mm., weight 4.5 grams. Black with 51



narrow white bands completely around body, and 5 wider ones on tail.

Coll. No. 2660: March 25, 1924, total length 295 mm., tail 35.8, eye 1.5 mm., ventrals 195, subcaudals 49, weight 6.2 grams.

Coll. No. 30,105: Caripito, May 17, 1942, total length 390 mm., tail 48 mm. On the body are 35 complete black bands, averaging three scales in width, bounded dorsally by single scale lines of white. The black bands are separated at equal distances by broad bands of pale red much dulled by black on the distal half of each scale, producing a checkered appearance. The black spots die out at the edge of the pale salmon ventrals. The red interspaces are about three times the width of the black bands.

Coll. No. 3263: Kartabo, March 16, 1921, total length 400 mm., tail 60 mm. Latero-ventral head band red, then a black nuchal band, next the first somatic red, black-tipped band. Twenty-four black bands on body separated by red interspaces, each of the latter four times as wide as the black. No segregation into pairs is observable. The red is very much dimmed by the half black scales. Ventrally, the red interspaces are immaculate. The tail has a wholly different pattern, being black above with eight pairs of single scale width, broken pink lines. Ventrally these widen, and broad, black subcaudal bands alternate with red spaces, with a mottling of black in the center of the latter.

Coll. No. 640: June 30, 1922, Color Plate 416, total length 425 mm., tail 40 mm., ventrals 213, subcaudals 32, weight 11 grams. This specimen has 35 red bands on the dorsal surface and an equal number of dark red ones.

Coll. No. 2735: April 4, 1924, total length 453 mm., tail 41, head length 12, eye 2.3 mm., ventrals 200, subcaudals 30, weight 15.5 grams. Black above with faint blue sheen and slight iridescence all over in the sunlight. There are 58 narrow rings of dull white, grouped in pairs on each side of interspaces which are narrower and darker than the spaces between the pairs. These rings are broken above, but form wider, well defined bands across the ventral surface. A broad band of pale yellowish-white diagonally forward across side of face. Four of the rings which occur on the tail have a yellowish tinge and are wider than the somatic white rings.

Coll. No. 3265: June 15, 1922, total length 465 mm., tail 63 mm. The pale body rings are very narrow and broken above, widening below where they can be observed to form rather indefinite pairs, covering one or two ventrals as compared with three or four ventrals between. The usual latero-ventral cephalic band. The first body pair of white lines, while very narrow above, are wide

and actually fuse below, and the second pair almost joins ventrally. Altogether the 66 rings on body form 30 pairs. There are nine wide, unpaired white rings on the tail.

Coll. No. 634: September 10, 1919, total length 480 mm., tail 40 mm. Above iridescent dark steely blue, with about a dozen narrow, very faint cross bands on the anterior third of the body. From here back none are visible. Below we find the same iridescence, with 59 more or less regular cross bands of creamy white, usually covering half of two adjoining ventrals. The bands occur on about every fourth ventral, the anterior ten occurring over an area of 37 scales. A 60th band is found on the side of the head, beginning behind the eye and extending down across both jaws. The eye is small but well developed, the iris being dark brown.

Coll. No. 632: March 10, 1921, Color Plate 464, total length 400 mm., tail 50 mm. This specimen is unique in its pattern which closely resembles that of *Micrurus lemniscatus* although the coloring is quite different. The head is black except for a broad post-ocular, complete band of buffy yellow. There follows a wide area of black, trisected with two narrow, white lines. This black, white and yellow pattern is repeated ten times on the body and tail.

*Food*: The following are the contents of three stomachs: (1) Insect remains and a few quartz crystals. (2) A small snake. (3) Two small lizards, probably *Anolis*.

*Breeding*: The body of coral snake No. 640 was slightly enlarged posteriorly, and when it died two days after capture on June 22nd, two eggs were found, shell-less but almost full sized, elongate, measuring 7 by 25 mm.

#### FAMILY VIPERIDAE.

*Lachesis muta* (Linnaeus, 1758).

(Plate XII, Fig. 56).

*Names*: Bushmaster. Coonocooshe (Creole). Pah-tie-ee-sack (Awakai Indian).

*Range*: From Panama throughout north- and central South America.

*General Account*: The bushmaster is not rare at Kartabo but much less common than the fer-de-lance, whereas the opposite is true at Caripito where one encounters many more of the present species than fer-de-lance snakes. We seldom found a bushmaster in motion, but always coiled in a tight mat in a game trail. One of the first found was also the largest, No. 199, measuring 2596 mm., or eight feet, six inches over all. I have given an account of the capture of this giant in "Jungle Peace," pp. 188 to 195. It was sent north alive to the New York Zoological Park on April 10, 1916.

In the case both of the bushmaster and the fer-de-lance we wondered why our eyes

were so often drawn to the coiled serpent before we were near enough to step on it. Experimenting with freshly caught specimens of both species I found that when I was tightly blind-folded I was aware of a distinct odor, even when six to ten feet away. This was especially true of the bushmaster, the odor being musky and very unpleasant. Unless we stopped and consciously sniffed, when our eyes were open other interfering sense impressions reduced the olfactory ones to only subconscious effect.

Twice I found large bushmasters closely associated in pairs, both times in spiny palm scrub.

*Measurements and Color in Life:* Coll. No. 199, eight feet, six inches over all, Color Plate 181, fig. b, had more lilac and violet in its coloring than usual, and the iris was straw yellow instead of reddish. The large dorsal markings were dark lilac with black borders and outer frames of pale violet.

Coll. No. 3275: A male, July 24, 1920, Plate 181, fig. a. Total length 1038 mm. (45 inches), tail 92, head length 46, eye 4.5, body width 30, body height 27 mm., ventrals 220, subcaudals 40, weight one pound. The top of head was seal brown, mottled with paler. Body with wide diamond-shaped markings beginning at back of neck. Black lateral cephalic band running into a curved band from eye almost to first ventral. Above this a band of light brown, then a narrow, broken line of black. Tawny olive on upper neck. Upper labials and side of face pale buff, deepening to buffy brown on snout. Lower labials and throat white tinged with pinkish-buff. Iris flame scarlet, coarsely blotched and mottled with dark brown toward the outer rim, leaving a wide area immaculate around pupil. Pupil a rather wide vertical ellipse.

Coll. No. 656: Kartabo, July 7, 1922, Color Plate 421. Total length 1070 mm. (five feet, seven inches), tail 165, head length 70, head width 48, eye 6, body width 50, body height 45 mm., weight four and a half pounds. This was essentially a yellow brown phase and complete with the pattern of jungle débris when coiled as we first found it. The eye was scarlet, the head and much of the sides of the body pale wood brown. The postocular black band was very strongly marked. The dorsal diamonds were almost solid black, with a few rufous scales at their center, and

each banded with a narrow frame of pale buff. The ventrals were yellowish-brown, and the dorsal markings became very irregular and whitish on the tail.

*Food:* Spiny rats seem to be the favorite diet of bushmasters both at Kartabo and Caripito. Five individuals were found feeding on these rodents.

*Breeding:* One female taken at Kartabo on April 6 contained seven nearly formed eggs, each three inches in length, and another snake captured on May 19 at Caripito had a 2½-inch shell-less yolk.

*Bothrops atrox* (Linnaeus, 1758).

(Plate XII, Figs. 57, 58 and 59).

*Names:* Fer-de-lance, Labaria (Creole). Sah-ru-rima (Akawai Indian).

*Range:* Mexico south to northern and central South America. Martinique and Tobago.

*General Account:* The fer-de-lance is a common snake at Kartabo but rather rare at Caripito. Between forty and fifty were taken alive and sent north or preserved. Young ones were frequently found in the bamboo clumps near the Kartabo laboratory and the larger ones on the deeper jungle floor. The fer-de-lance is nocturnal, but occasionally is active on overcast days. A full time embryo measured 10½ inches and the largest snake we saw, a female, was a little more than 4 feet, 3 inches over all.

Boulenger's color descriptions (Catalogue of Snakes of British Museum) are usually from preserved specimens, and wholly unlike those of living snakes, but the following characterization of this species is perfect: "Coloration very variable; gray, brown, yellow, olive or reddish above, uniform, or with more less distinct dark spots or crossbands, or with dark triangles on the sides inclosing pale rhombs. Lower parts yellowish, uniform or powdered or spotted with brown, or brown with light spots."

The only two really characteristic patterns which seem always to be present, are the dark band extending on the side of the head from the eye to the gape, and the conspicuous whitish or lemon yellow color of the tail.

Comparative measurements of 11 individuals, from 268 to 1290 mm. total length, are as follows:

Coll. No. ....	221a	3134	2762	2794	3531	2988	2788	221	3255	613	3121
Total length (mm.)....	268	320	346	422	557	1040	1110	1120	1159	1228	1290
Tail (mm.).....	38	42	46	62	72	153	150	120	159	168	165
Eye diameter (mm.)....	3	3	3.5	3.5	3.9	5	5	5	5	5	6
Ventrals .....	204	201	200	191	207	205	203	196	204	195	206
Subcaudals .....	69	65	64	65	73	70	64	62	67	70	66
Weight (grams).....	3.3	8.5	10.2	21	25	342	380	292	370	384	373



The head length in the two extremes of the embryo and the 1290 mm. specimen are 10 and 41 mm. The weight of the unborn embryo when the yolk sac is included, is increased from 3.3 to 10 grams.

*Color in Life:* Coll. No. 221a, Kartabo, nearly born embryo, length 268 mm., Color Plate 234, September 25, 1920. This one of eight nearly full-developed embryos was the offspring of No. 221. It was very active, dragging about its yolk-sac which weighed three times as much as itself. It showed two shades of lilac, very pale and darker, the two being arranged in a series of equally wide bands down the back. The characteristic dark eye to gape band, and the pale tail are both in evidence. The iris is much darker than in the usual fer-de-lance, and the wide pupil is vertical, not directed slightly forward as in older snakes.

Coll. No. 3100: young snake of 305 mm. length, June 14, 1919. Strong reddish-brown above with cross bands of dark olive, each constricted at mid-back. Whitish below, thickly checkered with pinkish-brown. Iris golden yellow, covered with a vertically striated mesh of black.

Coll. No. 2794: length 422 mm., May 11, 1924. Looked down upon as on a flat skin, the pattern is of a series of transverse, broad, hour-glass figures separated by narrow diamond interspaces. The boundaries are formed by narrow, yellowish-white lines. The anterior half of the body is of a general pale brown, the posterior half being much darker with a thick scattering of round, blackish-brown spots. Black, lateral head line and pale yellow tail as usual. Ventrals dominantly black with many yellow spots.

Coll. No. 2827: length 465 mm., May 16, 1924. Similar to No. 2794, except that throughout, the hour-glass pattern is very dark, and the ventrals dominantly yellow with dark lateral checkers.

Coll. No. 3258: length 615 mm., Color Plates 97 and 111, August 12, 1919. An extremely dark phase. Dark purplish-brown above, coarsely mottled with black. Tail very conspicuously lemon yellow, and ventrals bright salmon red, checkered with black. Head dark brown above, black on sides and below, with large patches of pink-bounded gray in the centers of 6 upper and 5 lower labials. Loreal scales pink, and iris pale gold with three broad antero-posterior bands of pinkish-red. Pupil, as in all fer-de-lance of this length and larger, tipped obliquely forward about twenty degrees.

Coll. No. 2788: female breeding, May 6, 1924, Color Plate 731, length 1110 mm. General color above hair brown with the typical *Bothrops atrox* markings showing as rhomboidal patches of dark brown, enclosing the lighter tone. These markings however are

very faint. The top of the head has a faint greenish tinge. The labial region is light olive buff with very dark lateral facial line of broken streaks, which occur strongly on the keels of the scales, running from the eye back and obliquely downward. Ventrals cream buff shading to olive toward tail, and with touches of carnelian red on sides of the first few ventrals. Ventrals mottled, strongly toward tail, with light gray.

Coll. No. 221: female breeding (parent of No. 221a), length 1120 mm., Color plate 234, September 25, 1920. Head purplish gray, paler at the posterior sides and pinkish at snout. Sides of head also purple, all labials thickly mottled with dark brown, and the usual lateral dark line. Body purplish-gray with dark, transverse triangular markings of dark lilac, edged with smoke gray. Chin light buff tinged with purplish, ventrals Naples yellow, upper edges with touches of pink, fading to cream color, and mottled more and more thickly with bluish-gray toward tail. Iris warm yellow with dense flecking of dark gray and brown all over, except for pupil rim.

Coll. No. 613: length 1228 mm., Color Plate 400, June 14, 1922. General color of head and back hair brown, entire length with evenly spaced transverse bands of dark olive, over an inch in width at mid-body, all widely edged and blotched with black. The interspaces are edged with light grayish-olive and have a large, indistinct central diamond patch and lateral shading of brownish-black. Sides of head and lower labials bluish-gray with black loreal streak, and a few irregular black spots. Chin smoke gray anteriorly, becoming lighter under neck and merging into the general bright Naples yellow of the ventral ground color. On the lateral portion of the ventrals is a series of large, irregular, roundish black spots, each separated by about two ventrals. Tail dull lemon yellow, inconspicuous. Iris ground color maize yellow, very heavily streaked and stippled with black, with a faint streak of red through the obliquely vertical pupil and a touch of red about the pupil rim.

Coll. No. 3121: length 1290 mm., Color Plate 180, July 25, 1920. Top of head brownish-black with supraoculars and keels of scales mouse gray. Loreals pink. Side of face antimony yellow, with three perpendicular marks on upper labials of black. Broad oblique band extending from eye almost to fourth ventral black. Body above with broad transverse bands of dusky violet edged narrowly with brown. Ventrals amber yellow deepening to apricot yellow on upper edges, mottled more and more thickly toward tail with black. Pupil a moderately wide, oblique ellipse. Iris pale yellow gold flecked with ochraceous orange, with three zones of

mottling of dark brown, one at either end of pupil, and a broad band horizontally across the middle.

**Food:** Seven stomach contents were as follows: (1) A large *Leptodactylus pentadactylus*. (2) Remains of two mice. (3) In this snake, 887 mm. over all, was a spiny rat 410 mm. in length. (4) Two medium Ameivas. (5) 2 young spiny rats. (6) Unidentified lizard, small snake and the fur of some small mammal. (7) Shot while stalking a manakin.

**Breeding:** No. 2788, Kartabo, 1110 mm. long, taken on May 9, contained 16 eggs about half-developed. No. 2988, Kartabo, 1040 mm., taken on June 19, 9 large eggs almost ready for deposition, measuring 20 by 30 mm. No. 221, Kartabo, 1120 mm. total length, captured on September 25, contained 8 young snakes almost ready for birth; No. 221a, 268 mm. long is one of these. No. 3249, Kartabo, 1140 mm., taken October 20, contained 11 large embryos.

***Bothrops bilineatus* (Wied, 1825).**

(Plate XIII, Figs. 60 and 61).

**Names:** Tree Fer-de-lance, Green Fer-de-lance. Green Labaria (Creole). Eye-dee-ahmo (Akawai Indian).

**Range:** Guianas, Brazil, Peru, Bolivia and Ecuador.

**General Account:** A rare snake at Kartabo, only three specimens being taken. It may well be more common than we think, owing to the difficulty of detecting it among the same colored jungle foliage. Except for the general green color it differs little from *atrox*, having even the lateral facial oblique band and the conspicuous, self-colored tail. It is pale leaf green above, uniform or sparsely spotted with darker, and yellow below. In the late *atrox* embryo the tail is 14 per cent. of the total length, and in the largest *atrox* taken it is 12 per cent. In the present species the tail is slightly longer, 15 to 16 per cent. of the length.

All three specimens were taken among the branches of low jungle shrubs. No. 354 was only five feet from the ground. I walked within a foot of the snake, and it made an abortive attempt at my face, striking the rim of my hat before I saw it and broke its back with my gun barrel.

**Measurements and Color in Life:** Coll. No. 345, Kartabo, April 4, 1920. Total length 540 mm., tail 80, head length 18, width 12, eye diameter 3, body width 12, body height 13 mm., rows of scales 33, ventrals 202, subcaudals 76, weight 38.2 grams. General color above lichen green, shading to grass green toward tail, which changes abruptly to pale pinkish-buff near the tip. Lateral line on side of head and about 40 sets of alternating, irregular, short, transverse dor-

sal marks light cadmium yellow, edged with black. Side of head greenish-yellow, shading into a wide patch of picric yellow on the side of the neck, which in turn merges into the lateral body line of straw deepening to citron toward the tail. Ventrals pale lumiere green lighter toward tail, touched with lighter greenish-yellow on the lateral edges of the ventrals. Iris light yellow green flecked with darker green, paler toward pupil. The character of this marking is of a maze of indistinct fibers, extending more or less up and down. Pupil is an oblique vertical wide slit.

Coll. No. 2671: Kartabo, April 3, 1924, Color Plates 675 and 676. Total length 752 mm., tail 115, head length 26, eye 4, mm., rows of scales 31, ventrals 208, subcaudals 77, weight 39.4 grams. General color of head and back leaf green, dulled on head and anterior body by fine black dots which are larger and closer on the head. A lateral body stripe of chalcedony yellow extends along the outermost row of scales formed by the solid color of these scales and a small triangle at the edge of the ventrals. This yellow line is edged below by a narrow line of dark green along the ventrals. A band of ochraceous orange with faint black streaks extends from the eye to angle of mouth. This streak is broken in this individual snake on the left side by the intrusion of a single green scale. A few small markings of the same orange color occur at intervals along each side of the mid-back. Upper labials and a slight shading on the lower, lime green with scattered black dots. The remainder of the labials and chin pale lemon yellow which joins a lateral line on the side of the neck. Ventrals primrose yellow, paler toward tail, the tip of which for an inch is solid purplish-pink. Iris chalcedony yellow with fine stippling of jade green everywhere except at the top.

In 22 years this snake has changed to grayish-blue above, and the ventral yellow has become straw.

Coll. No. 267: Kartabo, November 5, 1920, Color Plate 262, total length 424 mm. Head above and back pale turquoise green with many irregular short markings down each upper side, each of which is orange framed with black dots and dashes. Scales of supra- and preocular areas of head pale greenish dotted with large black spots. Labials pale buffy yellow with considerable blotching of rich green. Postocular oblique band orange, spotted with black. Iris a maze of dark green fibrous markings. Chin and throat yellowish-white changing gradually into the general ventral color of immaculate pale blue green.

**Food:** No. 345 had swallowed a large *Hyla maxima*, 180 mm. over all. No. 267 had made



a meal of four large Hylas and two anolid lizards.

FAMILY CROTALIDAE.

*Crotalus durissus terrificus* (Laurenti, 1768).  
(Plate XIII, Figs. 62 and 63).

*Names:* Green Rattlesnake. Jungle Rattlesnake. Cascabel (Spanish). Sak-kah-sak (Akawai Indian).

*Range:* Guianas, Venezuela and Colombia, to northern Argentine. Paraguay and south Brazil.

*General Account:* Very rare in the jungle at Kartabo where only three specimens were seen or taken during eight seasons. At Caripito not rare in the open llanos or savannas. One Kartabo snake had swallowed a large spiny rat.

Coll. No. 556: Kartabo, April 29, 1922, Color Plate 548. This was taken at night while crawling along a jungle trail near the laboratory. The tail was injured and there were only six remaining rattles. Like the other Kartabo specimens this rattler was green in general coloring, with variegated shades from pale to deep forest green, with irregular dorsal markings of black. The eyes were connected by a black band, and from the eyes back, two broad bands of dark brown extended along the body for some

distance. The iris was green with two large vertical patches of brown mottling on the central three-fifths. The rather narrow pupil was vertical, not oblique as in the fer-de-lance. Below, the ventrals were creamy white, anteriorly deepening into greenish posteriorly.

Coll. No. 30058: Caripito, taken on the open savanna. It measured 740 mm. over all and was found on April 20, 1942. This and five others seen or taken were wholly brown of varying shades with black markings. The head was pale brown with a brownish-black band from the snout back over the mid-crown on to the nape. Two indistinct bands of dull reddish extended from the lateral head along the back. A postocular band of black extended back to the gape, then turned forward along the line of the mouth, covering first the lower labials and then passing on to the upper ones, and swinging up and back to the anterior aspect of the eye. It actually joined the postocular streak by a broad central brown band across the iris itself. The rest of the iris was deep orange. A series of very distinct black diamonds, bounded with pale buff, extended down the back, with irregular lateral streaks posteriorly along the sides. The ventral surfaces were pale brown.

## EXPLANATION OF THE PLATES.

(The black-and-white figures in the Plates are reproductions of color paintings by Isabel Cooper and Helen Tee-Van. Photographs are by William Beebe and John Tee-Van).

## PLATE I.

*Leptotyphlops septemstriata*

Fig. 1. Life size photograph.

*Typhlops reticulatus*

Fig. 2. Head.

Fig. 3. Entire.

*Inilius scytale*

Fig. 4. Head and fore body.

Fig. 5. Mounted skin. Photograph.

## PLATE II.

*Boa canina*

Fig. 6. Boa in tree. Photograph.

Fig. 7. Head. Photograph.

## PLATE III.

*Constrictor c. constrictor*

Fig. 8. Head of adult.

Fig. 9. Entire snake.

Fig. 10. Twelve-foot boa on ground. Photograph.

## PLATE IV.

*Epicrates c. cenchris*

Fig. 11. Head.

Fig. 12. Entire snake.

Fig. 13. Boa constricting on arm.

## PLATE V.

*Eunectes gigas*

Fig. 14. Entire snake.

Fig. 15. Head of adult.

Fig. 16. External hind claw.

## PLATE VI.

*Atractus trilineatus*

Fig. 17. Head.

Fig. 18. Entire snake.

*Chironius fuscus*

Fig. 19. Head.

*Clelia c. clelia*

Fig. 20. Head.

*Dipsas catesbyi*

Fig. 21. Entire snake.

## PLATE VII.

*Dipsas indica*

Fig. 22. Head and fore body.

Fig. 23. Entire snake.

*Dipsas variegata*

Fig. 24. Head.

Fig. 25. Entire snake.

*Dryadophis b. boddaerti*

Fig. 26. Head.

Fig. 27. Head of young snake.

## PLATE VIII.

*Drymarchon c. corais*

Fig. 28. Entire snake.

Fig. 29. Head.

*Erythrolamprus aesculapii*

Fig. 30. Head and fore body.

Fig. 31. Entire snake.

Fig. 32. Entire snake, variation.

*Imantodes cenchoa*

Fig. 33. Head.

Fig. 34. Entire snake.

## PLATE IX.

*Leimadophis reginae*

Fig. 35. Head.

*Leptodeira a. annulata*

Fig. 36. Head.

*Leptophis a. ahaetulla*

Fig. 37. Head.

*Oxybelis a. aeneus*

Fig. 38. Head.

Fig. 39. Entire snake.

*Oxybelis fulgidus*

Fig. 40. Head.

## PLATE X.

*Pseustes poecilonotus polylepis*

Fig. 41. Head.

Fig. 42. Head and fore body.

Fig. 43. Snake mimicking liana.

*Pseustes s. sulphureus*

Fig. 44. Snake puffing, side view.

Fig. 45. Snake puffing, front view.

*Spilotes p. pullatus*

Fig. 46. Head.

*Tantilla melanocephala*

Fig. 47. Head.

*Trypanurgos compressus*

Fig. 48. Head.

## PLATE XI.

*Xenodon colubrinus*

Fig. 49. Head.

*Xenodon severus*

Fig. 50. Entire snake.

Fig. 51. Snake flattening head and neck.

*Micrurus lemniscatus*

Fig. 52. Head.

Fig. 53. Entire snake.

## PLATE XII.

*Micrurus psyches*

Fig. 54. Head.

Fig. 55. Entire snake.

*Lachesis muta*

Fig. 56. Head.

*Bothrops atrox*

Fig. 57. Head, adult male.

Fig. 58. Head, adult female.

Fig. 59. Heads and coiled embryos.

## PLATE XIII.

*Bothrops bilineatus*

Fig. 60. Head.

Fig. 61. Entire snake.

*Crotalus durissus terrificus*

Fig. 62. Entire snake.

Fig. 63. Head.





FIG. 1.

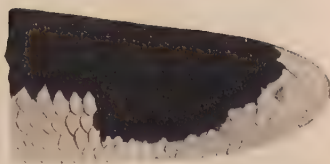


FIG. 2.

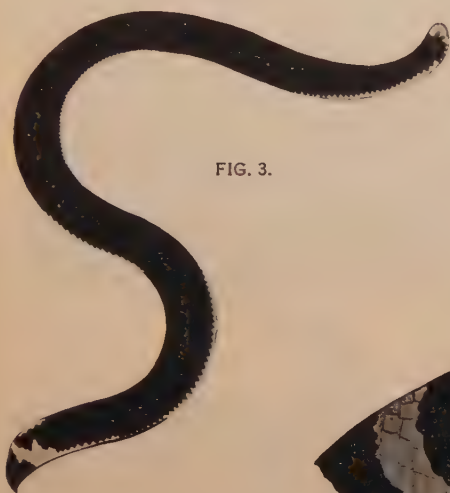


FIG. 3.

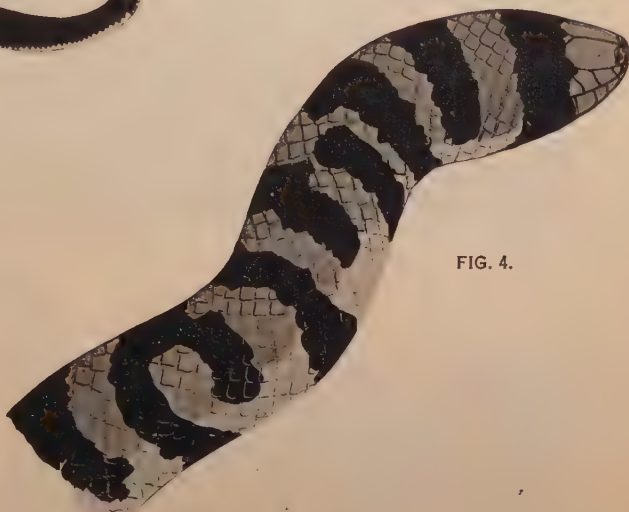


FIG. 4.

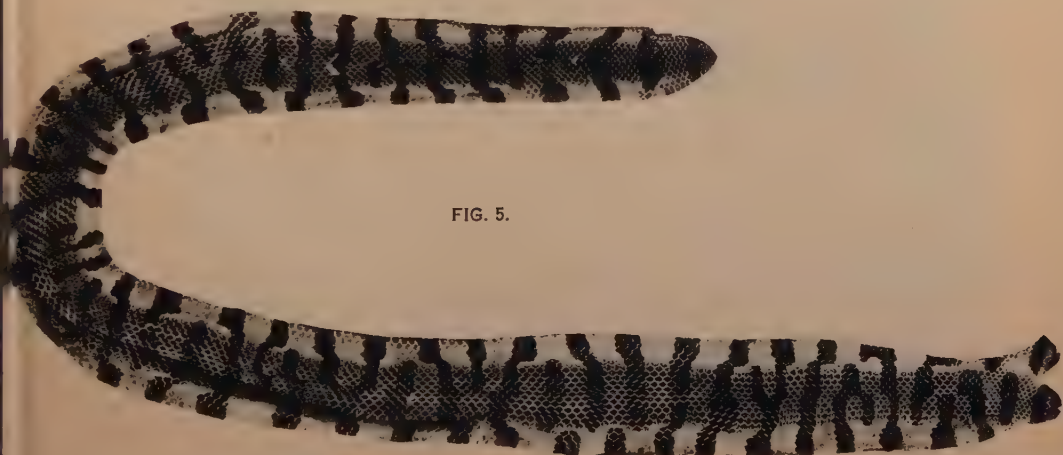


FIG. 5.

FIELD NOTES ON THE SNAKES OF KARTABO, BRITISH GUIANA,  
AND CARIPITO, VENEZUELA.



FIG. 6.



FIG. 7.

FIELD NOTES ON THE SNAKES OF KARTABO, BRITISH GUIANA,  
AND CARIPITO, VENEZUELA.



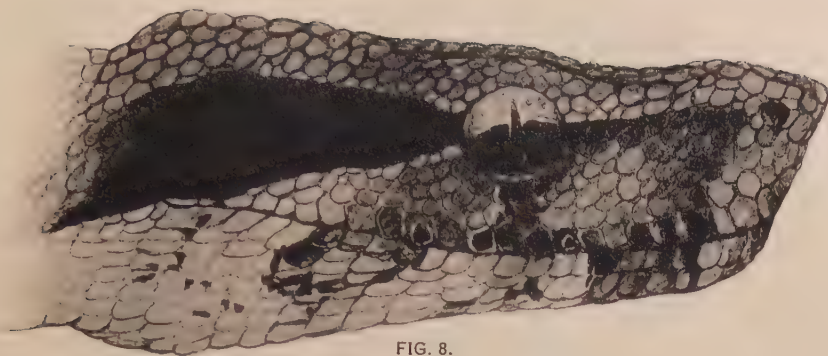


FIG. 8.

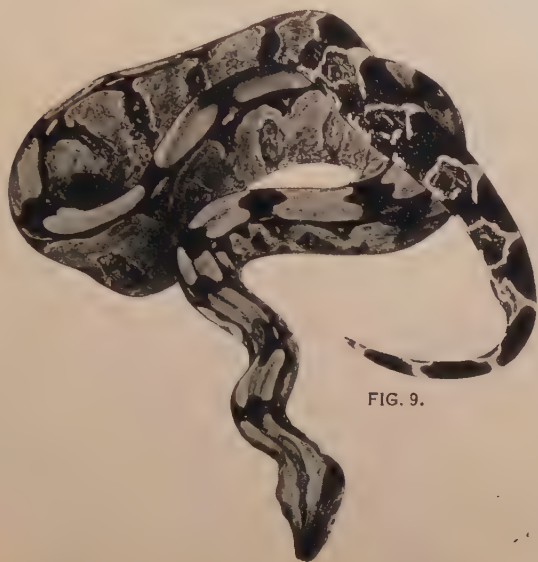


FIG. 9.



FIG. 10.

FIELD NOTES ON THE SNAKES OF KARTABO, BRITISH GUIANA,  
AND CARIPITO, VENEZUELA.

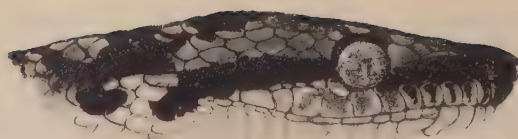


FIG. 11.

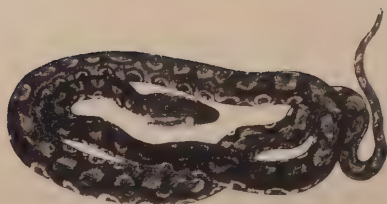


FIG. 12.



FIG. 13.

FIELD NOTES ON THE SNAKES OF KARTABO, BRITISH GUIANA,  
AND CARIPITO, VENEZUELA.





FIG. 14.



FIG. 15.



FIG. 16.

FIELD NOTES ON THE SNAKES OF KARTABO, BRITISH GUIANA,  
AND CARIPITO, VENEZUELA.



FIG. 17.

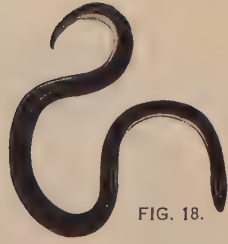


FIG. 18.

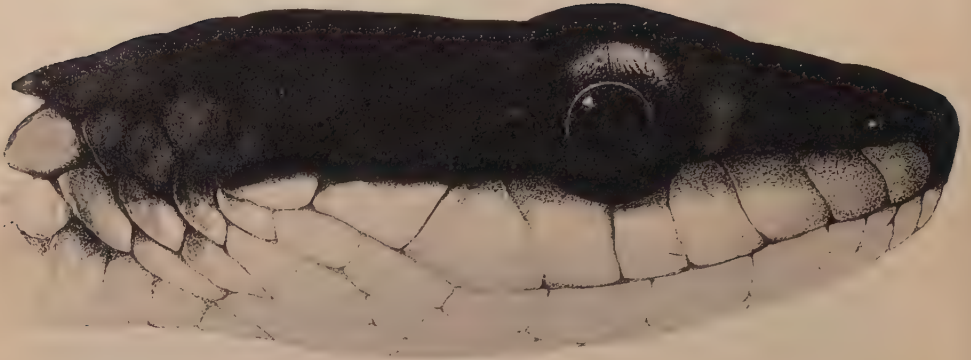


FIG. 19.

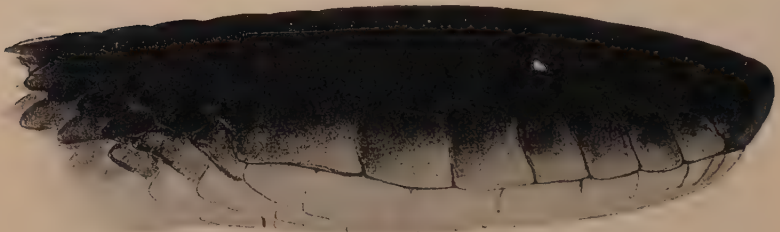


FIG. 20.

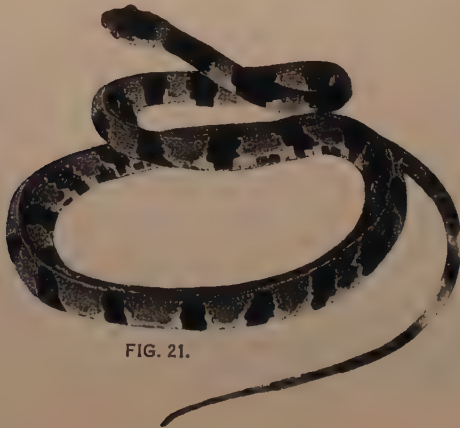


FIG. 21.

FIELD NOTES ON THE SNAKES OF KARTABO, BRITISH GUIANA,  
AND CARIPITO, VENEZUELA.



FIG. 22.

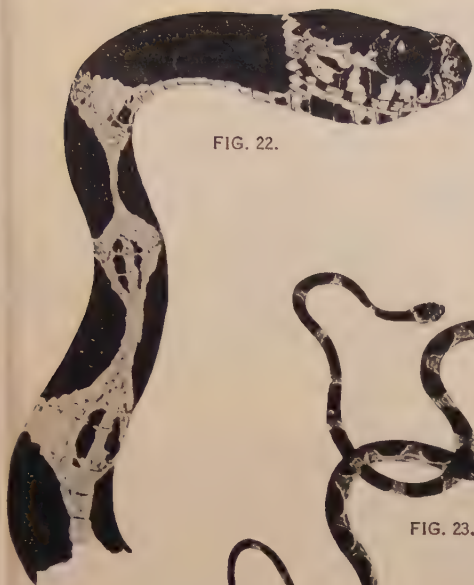


FIG. 24.

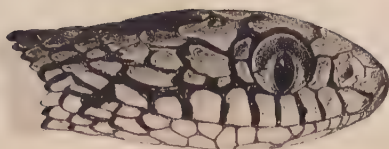


FIG. 23.

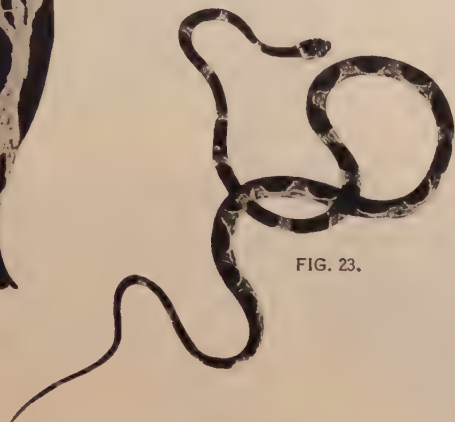


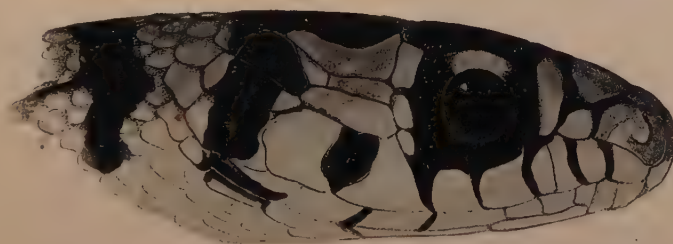
FIG. 25.



FIG. 26.



FIG. 27.



FIELD NOTES ON THE SNAKES OF KARTABO, BRITISH GUIANA,  
AND CARIPITO, VENEZUELA.

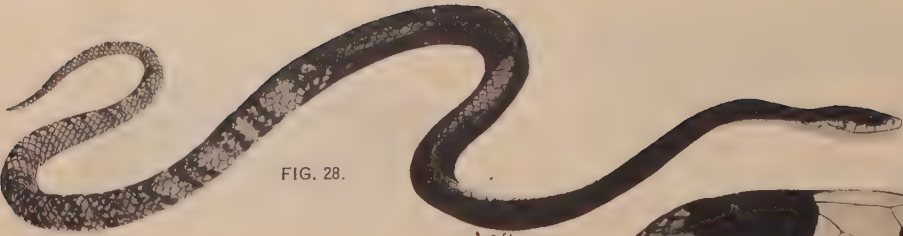


FIG. 28.



FIG. 29.



FIG. 30.



FIG. 31.

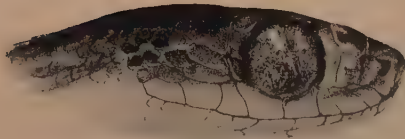


FIG. 33.

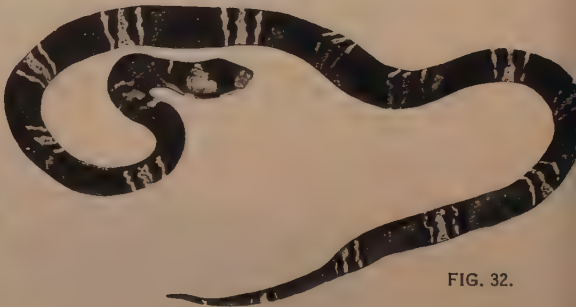


FIG. 32.

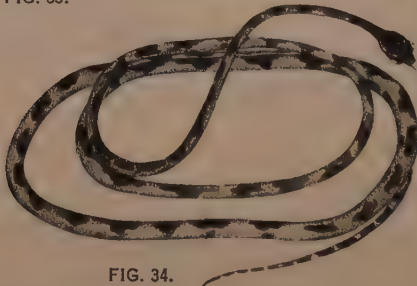


FIG. 34.



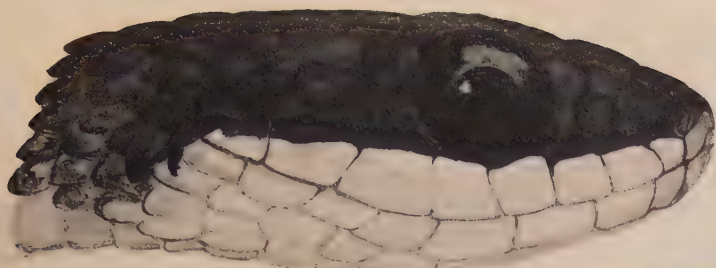


FIG. 35.



FIG. 36.

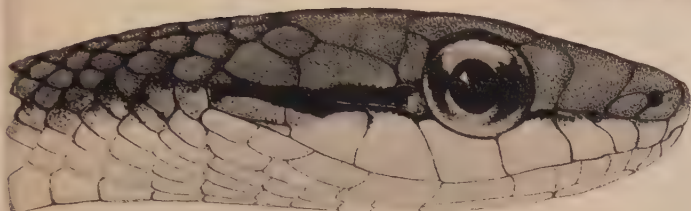


FIG. 37.



FIG. 38.

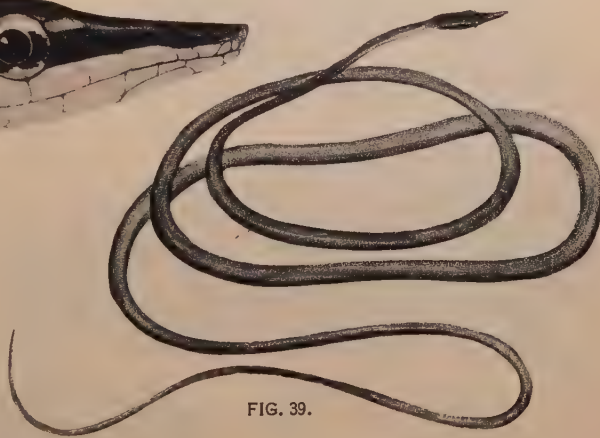


FIG. 39.

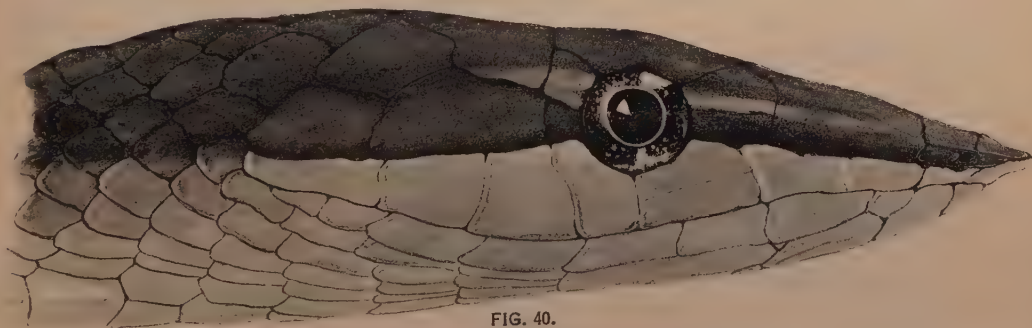


FIG. 40.

FIELD NOTES ON THE SNAKES OF KARTABO, BRITISH GUIANA,  
AND CARIPITO, VENEZUELA.



FIG. 41.



FIG. 42.



FIG. 43.

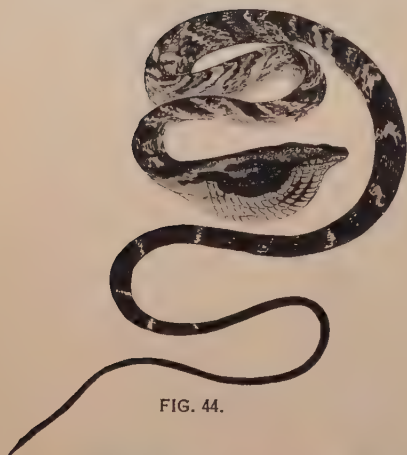


FIG. 44.



FIG. 45.

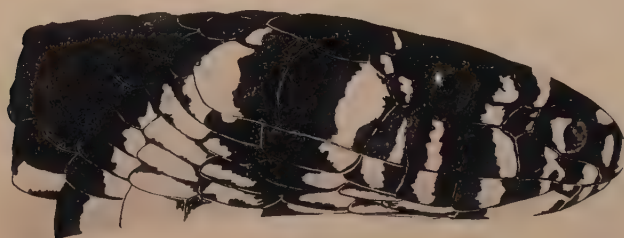


FIG. 46.

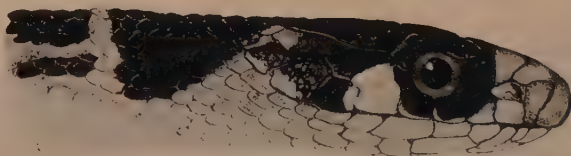


FIG. 47.

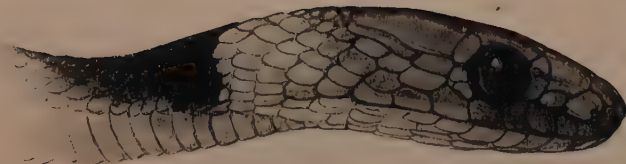


FIG. 48.

FIELD NOTES ON THE SNAKES OF KARTABO, BRITISH GUIANA,  
AND CARIPITO, VENEZUELA.





FIG. 49.



FIG. 50.



FIG. 51.



FIG. 52.

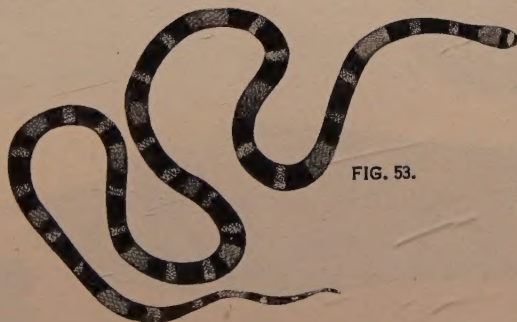


FIG. 53.

FIELD NOTES ON THE SNAKES OF KARTABO, BRITISH GUIANA,  
AND CARIPITO, VENEZUELA.





FIG. 54.



FIG. 55.

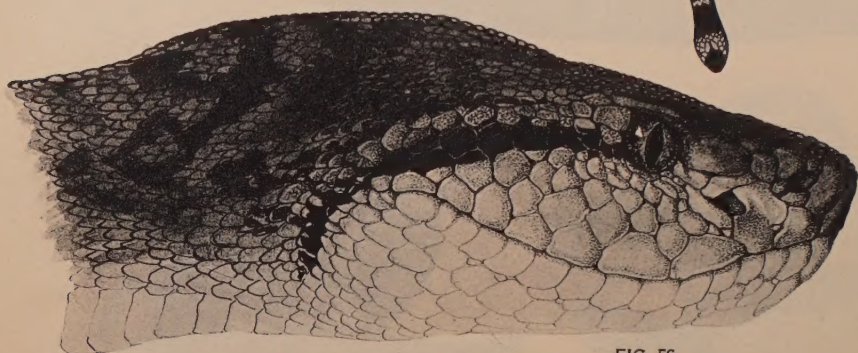


FIG. 56.



FIG. 57.

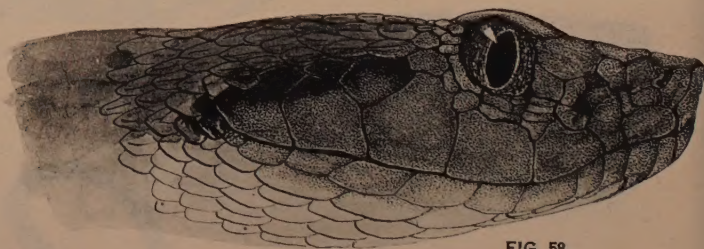


FIG. 58.



FIG. 59.





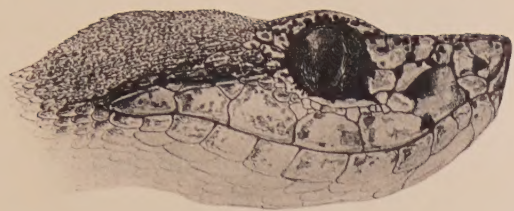


FIG. 60.

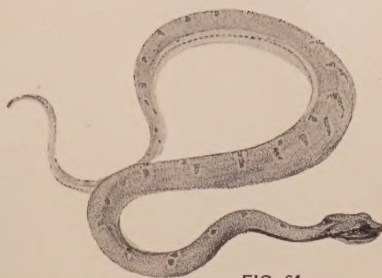


FIG. 61.



FIG. 62.

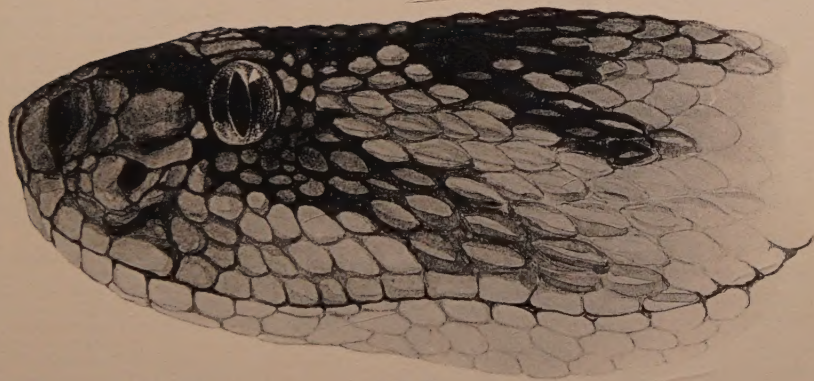


FIG. 63.

FIELD NOTES ON THE SNAKES OF KARTABO, BRITISH GUIANA,  
AND CARIPITO, VENEZUELA.

